

# GREATER EAST MANKATO INFILL SERVICE DISTRICT

Mankato, Minnesota

## FINAL ALTERNATIVE URBAN AREAWIDE REVIEW & MITIGATION PLAN

*Prepared by:*



JUNE 2007

Project Number: 06-9293



I&S Engineers & Architects, Inc.  
One firm - start to finish

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# ALTERNATIVE URBAN AREAWIDE REVIEW

This guidance has been prepared by the EQB staff to assist in the preparation of AUAR documents. It is based on the directive of 4410.3610, subp. 4 that “the content and format [of an AUAR document] must be similar to that of an EAW, but must provide for a level of analysis comparable to that of an EIS for impacts typical of urban residential, commercial warehousing, and light industrial development and associated infrastructure.”

**Note to reviewers:** Comments must be submitted to the RGU during the 30-day comment period following notice of the AUAR in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

## **General Guidance**

The AUAR guidance is based on the items of the standard EAW form (February 1999 version). Except where stated otherwise, the information requested is intended to augment (or clarify) the information asked for on the EAW form; therefore, the EAW form and the guidance booklet “EAW Guidelines” must be read along with the AUAR guidance.

The information requested must be supplied for each of the major development scenarios being analyzed, and it is important to clearly explain the differences in impacts between the various scenarios.

If this guidance indicates that an EAW item is not applicable to the AUAR, the item number and its title (the text in bold print on the EAW form) should be included with an indication that the EQB guidance indicates that no response is necessary in an AUAR (as opposed to just skipping reference to that item at all).

One general rule to keep in mind throughout the preparation of the AUAR document is that whenever a certain impact may or may not occur, depending on the exact design of future developments, the AUAR should cover the possible impacts through a “worst case scenario” analysis or else prevent the impacts through the provisions of the mitigation plan. Failure to cover possible impacts by one of these means risks the invalidation of the environmental review exemption for specific development projects.

**The requirements on this document pertinent to the AUAR process are in *italics*.**

**Document format.** If the RGU wishes to reorganize the AUAR content into a format other than that of the EAW form, it may do so, provided that a cross-reference index is supplied that informs the reader where the response(s) to each of the EAW items can be found (identifying the page(s) or specific section(s)).

## **1. Project title**

Greater East Mankato Infill Service District

## **2. Proposer**

City of Mankato (Developers to be Determined)  
Contact person Paul Vogel  
Title Community Development Director  
Address PO Box 3368  
City, state, ZIP Mankato, MN 56002-3368  
Phone 507.387.8613  
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## **3. RGU**

City of Mankato<sup>1</sup>  
Contact person Paul Vogel  
Title Community Development Director  
Address PO Box 3368  
City, state, ZIP Mankato, MN 56002-3368  
Phone 507.387.8613  
Fax 507.387.6845  
E-mail pvogel@city.mankato.mn.us

<sup>1</sup>Mankato Township has given the City of Mankato permission to act as the RGU for this Project. A joint resolution approving annexation has been approved by both the City of Mankato and Mankato Township.

## **4. Reason for EAW preparation**

The EQB guidance indicates that this item is not applicable to an AUAR.

The City of Mankato has filed a Resolution (dated January 22nd, 2007) ordering the preparation of this AUAR (See Appendix A—Resolution to initiate the AUAR process), whereas the City of

Mankato anticipates the development of land within a future growth area, and the City of Mankato has a Comprehensive Plan that includes the elements in items A to C of MN Rules 4410.3610 Alternative Urban Areawide Review Process, Subpart 1. Applicability, which allows the Local Government Unit (LGU) to use the procedures of this part to review anticipated residential, commercial, warehousing, and light industrial development and associated infrastructure in a particular geographic area within its jurisdiction.

## 5. Project location

County: Blue Earth County City/Township: Mankato (Mankato Twp)

        $\frac{1}{4}$          $\frac{1}{4}$  Section: 10, 11, 14, 15, 21, 22 and 23 Township: 108N Range: 26W

### Attach each of the following to the AUAR:

- *The country map is not needed for an AUAR.*
- *The USGS map should be included.*
- *Instead of a site plan, include:*
  - *a map clearly depicting the boundaries of the AUAR and any subdistricts used in the AUAR analysis;*
  - *land use and planning and zoning maps as required in conjunction with items 9 and 27; and*
  - *a cover type map as required for item 10.*
- *Additional maps may be included throughout the document wherever maps are useful for displaying relevant information.*

Exhibit A. Location Map *(this is not needed according to the EQB guidance, but is provide as a reference)*  
Exhibit B. USGS Topography Map *(7.5 minute, 1:24,000 scale map indicating project boundaries)*  
Exhibit C. AUAR Boundary Map *(depict boundaries of the AUAR and any subdistricts used in the AUAR analysis)*  
Exhibit D. Existing Land Use Plan  
Exhibit E-1. Scenario A. Future Land Use Map  
Exhibit E-2. Scenario B. Future Land Use Map  
Exhibit E-3. Scenario C. Future Land Use Map  
Exhibit F. Mankato Zoning Map  
Exhibit G. Cover Type Map

Additional maps have also been included to display relevant information:

Exhibit H. Existing Conditions Map  
Exhibit I. Soil Classifications & Features Map  
Exhibit J. Hydrology Features Map  
Exhibit K. Potential Wetland Areas Map  
Exhibit L. Area Transportation System  
Exhibit M-1. Sanitary Service Areas & Sub-districts  
Exhibit M-2. Improvements Required To Existing Sanitary System  
Exhibit N-1. Stormwater Service Districts & Conceptual Treatment Areas  
Exhibit N-2. Alternative Stormwater Treatment Concepts  
Exhibit O. Water Supply System Plan  
Exhibit P. Transfer Needs of the County Ditch System

## 6. Description

- a. Provide a project summary of 50 words or less to be published in the *EQB Monitor*.

The City of Mankato is proposing the Greater East Mankato Infill Service District, which is located south of US Hwy 14 and east of TH 22 in Sections 10, 11, 14, 15, 21, 22 and 23, in Mankato Township (T108N, R26W), Blue Earth County, Minnesota. Since this area has experienced continued development pressure, this study has been prepared in order to proactively address potential environmental issues. This project includes the planning for the conversion of approximately 2,100 acres of predominantly agricultural land and open space to a mix of residential, commercial, and public land use, open space and public infrastructure utilizing sustainable design practices and traditional neighborhood design

over the next 25 to 50 years or more. Three land use scenarios are being prepared for this project. This project will require the extension of public infrastructure including water, sanitary sewer, roads, stormwater system treatment and associated utilities.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

**Description.** *Instead of the information called for on the form, the description section of an AUAR should include the following elements for each major development scenario included:*

- anticipated types and intensity (density) of residential and commercial/warehouse/light industrial development throughout the AUAR area;*
- infrastructure planned to serve development (roads, sewers, water, stormwater system, etc.) Roadways intended primarily to serve as adjoining land uses within an AUAR area are normally expected to be reviewed as part of an AUAR. More "arterial" types of roadways that would cross an AUAR area are an optional inclusion in the AUAR analysis; if they are included, a more intensive level of review, generally including an analysis of alternative routes, is necessary;*
- information about the anticipated staging of various developments, to the extent known, and of the infrastructure, and how the infrastructure staging will influence the development schedule.*

The proposed area, named the Greater East Mankato Infill Service District (GEMISD) (herein referred to as AUAR area or project), has planned for a mix of residential, commercial, and public land use, open space and public infrastructure utilizing sustainable design practices and traditional neighborhood design. The AUAR area is located in Sections 10, 11, 14, 15, 21, 22 and 23 of Mankato Township, south of US Hwy 14 and east of TH 22, just east of Mankato, in Blue Earth County, Minnesota (See Exhibit A—Location Map). Since this area has experienced continued development pressure, this study has been prepared in order to proactively address potential environmental issues. The AUAR area is currently zoned agricultural by Blue Earth County. Development in the AUAR area will require the extension of public infrastructure including water, sanitary sewer, roads, stormwater systems and associated utilities.

The Alternative Urban Areawide Review (AUAR) process was chosen to study the AUAR area rather than an Environmental Assessment Worksheet (EAW) in order to review incremental impacts accumulating from a series of sequential projects. The AUAR process substitutes for an EAW or an EIS required for specific qualifying projects provided they comply with the review assumptions and mitigation measures. The review's key feature is that its subject is a development scenario or several scenarios for an entire geographical area rather than a specific project. These scenarios were established based on the comprehensive plan, interviews with community stakeholders and landowners in the AUAR area, city and county officials, local, state and regional organizations and agencies, and other relevant information.

Recent development interest on the east side of the City of Mankato has warranted the preparation of this AUAR. Development is already occurring in the adjacent areas along Madison Avenue and Trunk Highway (TH) 22 and Mankato and Eagle Lake already share some public infrastructure, including a sanitary forcemain from Eagle Lake to Mankato, and possibly water supply in the future. Landowners and developers have expressed an interest in the development of properties within the AUAR area, which will require new extensions of city infrastructure. The AUAR area has been receiving dual pressure being situation between the current city limits of Mankato and Eagle Lake.

Since the AUAR area has a unique opportunity to include the preservation of significant environmental features including woodlands, wetlands, stream courses, and open space, as part of the AUAR process, the City of Mankato has added a master-planning design element to the AUAR study that has examined strategic locations for urban service nodes, park interconnections, walk-ability, open space preservation opportunities, and the development of alternative stormwater designs/standards. The incorporation of these

elements into the AUAR will allow the AUAR to be adopted as part of Mankato's Land Use Plan as a specific sector plan. By doing this, it ensures a proactive master plan for the area to help guide the area sustainably with a focus on environmental impact and mitigation opportunities rather than as a reactive approach to development. Two documents have been created as part of the master-planning design element, which can both be found in the Appendix. The Planning Principles & Urban Design Alternatives can be found in Appendix G. The purpose of these principles is to provide a greater definition of the intent for the project area and provides details expressing the character and quality of the area to be pursued during development. The Parks and Open Space Plan ( Appendix H) has been developed to address the park and recreational needs and also the open space preservation efforts and greenway connections for the project area.

The land use in the AUAR area is mainly focused on mixed uses, integrating residential, commercial, public land use and open space design. The boundary of the study area can be found in Exhibit C—AUAR Boundary Map which includes approximately 2,100 acres. Three land use scenarios have been included as part of the review. The AUAR will focus on Scenario C. It was learned very early in this study that due to traffic volumes created by Scenarios A and B they would not be buildable land use plans. The existing transportation infrastructure could not be feasibly improved to the extent necessary to handle the high traffic volumes at key intersections (See Traffic Question 41). Scenario C represents the highest density land use plan possible, based on the detailed traffic analysis completed for Question 21. Land Use Scenario A (See Exhibit E-1—Scenario A. Future Land Use) shows the projected land uses as described in the current Mankato Land Use Plan Map and the Mankato Area Transportation and Planning Study (MATAPS). Scenario B (See Exhibit E-2—Scenario B. Future Land Use) includes mixed-use land designations. Scenario C (See Exhibit E-3—Scenario C. Future Land Use) expands on the mixed-use of Scenario B and represents the highest land use densities possible, based on the detailed traffic analysis completed, and focuses densities around nodes and alternative forms of transportation. The planning principles used while developing Scenario C has been included in Appendix G.

The estimated number and type of proposed development units for the AUAR area, as outlined in Exhibit E-1—Scenario A. Future Land Use, Exhibit E-2—Scenario B. Future land Use, and Exhibit E-3—Scenario C. Future Land Use, is provided in the following table:

**Table 6-1. Proposed Land Use Development**

|              |                                | SCENARIO A.<br>ESTIMATED UNITS |                         |       |                                   |   | SCENARIO B.<br>ESTIMATED UNITS |            |       |                      |                         | SCENARIO C.<br>ESTIMATED UNITS |            |       |                      |                         |
|--------------|--------------------------------|--------------------------------|-------------------------|-------|-----------------------------------|---|--------------------------------|------------|-------|----------------------|-------------------------|--------------------------------|------------|-------|----------------------|-------------------------|
| ID           | Proposed Land Use              | FAR<br>Multiplier <sup>1</sup> | Units/Acre <sup>2</sup> | Acres | Developable <sup>3</sup><br>Acres | Projected #<br>of Units or<br>square feet | FAR<br>Multiplier              | Units/Acre | Acres | Developable<br>Acres | Projected #<br>of Units | FAR<br>Multiplier              | Units/Acre | Acres | Developable<br>Acres | Projected #<br>of Units |
| 1            | Single Family                  | -                              | 4                       | 524   | -                                 | 2,096                                     | -                              | 4          | 755   | -                    | 3,020                   | -                              | 4          | 585   | -                    | 2,340                   |
| 2            | Multi Family                   | -                              | 12                      | 434   | -                                 | 5,208                                     | -                              | 12         | 220   | -                    | 2,640                   | -                              | 12         | 270   | -                    | 3,240                   |
| 3            | General Commercial             | 0.2                            | -                       | 222   | 45                                | -   | 0.2                            | -          | 79    | 16                   | -                       | -                              | -          | -     | -                    | -                       |
| 4            | Highway Commercial             | 0.15                           | -                       | 154   | 23                                | -   | 0.15                           | -          | 28    | 4                    | -                       | 0.15                           | -          | 49    | 7                    | -                       |
| 5            | Civic/Institutional            | 0.15                           | -                       | 38    | 6                                 | -   | 0.15                           | -          | 107   | 16                   | -                       | 0.15                           | -          | 40    | 6                    | -                       |
| 6a           | Mixed Residential              | -                              | -                       | -     | -                                 | -   | -                              | 30         | 48    | 17                   | 510                     | -                              | 30         | 29    | 10                   | 305                     |
| 6b           | Retail                         | -                              | -                       | -     | -                                 | -   | 0.35                           | -          | 48    | 17                   | -                       | 0.35                           | -          | 29    | 10                   | -                       |
| 7            | Neighborhood Commercial        | 0.35                           | -                       | 12    | 4                                 | -   | 0.35                           | -          | 15    | 5                    | -                       | 0.18                           | -          | 19    | 4                    | -                       |
| 8a           | Neighborhood Commercial/Retail | -                              | -                       | -     | -                                 | -   | 0.35                           | -          | 51    | 18                   | -                       | -                              | -          | -     | -                    | -                       |
| 8b           | Mixed Residential              | -                              | -                       | -     | -                                 | -   | -                              | 30         | 51    | -                    | 1,530                   | -                              | -          | -     | -                    | -                       |
| 9            | Park                           | -                              | -                       | -     | -                                 | -   | -                              | -          | -     | -                    | -                       | -                              | 0          | 41    | -                    | -                       |
| 10           | Lifestyle Center Commercial    | -                              | -                       | -     | -                                 | -   | -                              | -          | -     | -                    | -                       | 0.2                            | -          | 16    | 3                    | -                       |
| 11           | Office Industrial Campus       | -                              | -                       | -     | -                                 | -   | 0.2                            | -          | 180   | 36                   | -                       | 0.2                            | -          | 165   | 33                   | -                       |
| 12           | Mixed Office Commercial        | 0.4                            | -                       | 52    | 21                                | -   | -                              | -          | -     | -                    | -                       | 0.4                            | -          | 53    | 21                   | -                       |
| 13           | Office/Tech Flex Space         | -                              | -                       | -     | -                                 | -   | -                              | -          | -     | -                    | -                       | 0.25                           | -          | 34    | 9                    | -                       |
| 14           | Industrial/Commercial          | 0.18                           | -                       | 168   | 31                                | -   | 0.18                           | -          | 168   | 30                   | -                       | 0.18                           | -          | 268   | 48                   | -                       |
| 15           | School                         | -                              | -                       | -     | -                                 | -   | -                              | -          | -     | -                    | -                       | 0.1                            | -          | 35    | 4                    | -                       |
| 16           | Open Space                     | -                              | 0                       | 460   | 0                                 | -   | -                              | 0          | 460   | 0                    | -                       | -                              | 0          | 460   | 0                    | -                       |
| <b>TOTAL</b> |                                |                                |                         | 2,064 | 130                               | 7,304                                     |                                |            | 2,064 | 159                  | 7,700                   |                                |            | 2,064 | 155                  | 5,885                   |

<sup>1</sup> The Floor Area Ratio (FAR) numbers were provided by SRF Consulting, Inc. as given in the 2003 Mankato Area Transportation and Planning Study (MATAPS) and through real-life examples of similar land uses and developments.

<sup>2</sup> The 'Units per Acre' figure was provided by SRF Consulting, Inc. and was calculated utilizing real-life examples of similar land uses and developments.

<sup>3</sup> The acreage given is the estimated developable area and not what is actually developable. Many of the areas include wetland, pipeline easements, ROW area and other inclusions which could further decrease the amount of developable acres beyond what was taken into account with the FAR Multiplier.

The proposed land uses shown in Exhibit E and the land uses listed above are described in the table on the following page:

**Table 6-2. Land Use Descriptions**

| Type    |                                | Description  | Density / FAR             |
|---------|--------------------------------|--|---------------------------|
| 1       | Single-Family                  | Averaging 4 units per acre, this category would accommodate traditional conventional residential development.  | 4/units/acre              |
| 2       | Multiple-Family                | Averaging 12 units per acre but no less than 5 units per acre, this category would accommodate 2-6 unit building as well as condominiums, and apartments.  | 12/units/acre             |
| 3       | General Commercial             | Mall, shopping center and big box retail development, with associated surrounding retail and service uses, but only ancillary office uses and no residential uses. Oriented primarily to the motorist, with planned internal circulation patterns to accommodate pedestrian movement. Requires access to regional transportation routes. May include regional district-wide green infrastructure for watershed protection.   | .2 FAR                    |
| 4       | Highway Commercial             | Commercial and office development designed to address needs and convenience of the motorist. Pedestrian access and connection are provided. No residential uses. Situated along arterial roads. Can include a mix of auto- and neighborhood-oriented commercial uses.  | .15 FAR                   |
| 5       | Civic/ Institutional           | Public and Private uses such as civic centers, clinics, hospitals, government facilities, churches and schools would be considered in this category.   | .15 FAR                   |
| 6a & 6b | Mixed Use (residential retail) | The broadest mix of uses, including office, retail, and residential use, with performance standards to ensure compatibility. Vertically mixed buildings are anticipated of 2 stories or more. Includes areas that are in transition from commercial/industrial uses and residential areas.   | .35 and 30 units per acre |
| 7       | Neighborhood Commercial        | Small- to moderate scale commercial uses serving primarily the adjacent neighborhood(s). May include specialty retail; community gathering businesses such as coffee shops or lower intensity entertainment; offices; studios or housing above retail (storefront retail with vertical mixed use). Typically situated in or adjacent to residential neighborhoods.   | .18 FAR                   |
| 9       | Park                           | Active spaces  | 0                         |
| 10      | Lifestyle Center Commercial    | A retail center or mixed-use commercial development generally arranged in open-air configuration that combines the traditional retail functions of a shopping mall with leisure amenities oriented towards upscale consumers. May serve as a destination point for leisure time, including eating establishments and entertainment. They are noted for design ambience and amenities such as fountains and street furniture conducive to casual browsing.                                    | .2 FAR                    |
| 11      | Office Industrial Campus       | Areas for manufacturing, warehousing and distribution, production or processing; uses that have limited outdoor impacts such as noise, odor or storage, and can be located in relative proximity to non-industrial uses. Also would include office complexes, buildings and mixture of warehousing and office space. Site plan approach would include sharing of parking spaces, access lanes, amenities and stormwater treatment facilities as opposed to individual site design treatment. | .2 FAR                    |
| 12      | Mixed Office Commercial        | This use would exclude larger scale commercial uses. Most retail and commercial uses are allowed only in a vertical mixed use context. Smaller neighborhood based businesses would be mixed with office uses.  | .4 FAR                    |
| 13      | Office Tech Flex Space         | Accommodates office structures which may need prototype facilities or are in need of group technical support. Areas are intended for related activities that benefit from close proximity. Examples would include cellular companies, computer software or hardware, wireless enterprises, technology research and development, etc.   | .25 FAR                   |
| 14      | Industrial/ Commercial         | Accommodates the typical commercial and industrial uses. When zoning occurs, locations should be mapped so industrial users have convenient access to major transportation networks and benefit from visibility to/from these corridors. Examples would include: warehousing, manufacturing, production, distributing, sales lots, retail business, etc.   | .18 FAR                   |
| 16      | Open Space                     | Lands with substantial restrictions. High natural resource or scenic value, or and severe development limitations. Primarily public lands but limited private use is anticipated subject to use and design controls. Examples include: most city parklands and primary viewsheds; shorelands of lake, rivers, streams; wetlands and floodplains; high-value habitat; low-intensity private or public uses.   | 0                         |

Based on the 2005 Minnesota State Demographer's population projections, the City of Mankato has a population estimate of 35,031 persons for 2005 with an average of 2.31 persons per household. The proposed land use under Scenario C will add approximately 5,981 housing units, which would add approximately and 13,817 persons to the City. This would result in a substantial population increase of almost 40%. Using the City of Mankato's 1% annual growth rate assumptions, the timeline for full-build out of the project area is most likely thirty years or more.



The City of Mankato Sanitary Sewer Master Plan (SSMP, Zenk, Read, Trygstad, and Associates, 1987) was developed to consider the needs of the City and to address corresponding cumulative issues. This Sanitary Sewer Study is currently being updated by I&S Engineers & Architects, Inc. with an expanded study area that includes the AUAR area, and is proposed to be completed in early 2007. The proposed improvements to the sanitary sewer system presented in this AUAR represent a portion of the update of the City's SSMP. The plan will be used to prepare the orderly expansion of wastewater collection facilities in future growth areas including the AUAR area. Wastewater generated within the AUAR area will be collected in gravity sewer lines where possible. A lift station will be needed to serve the northeast portion of the AUAR area.

The City of Mankato Water System Master Plan (WSMP, Black & Veatch, 1992) was developed to address the future demands of the City and also address corresponding cumulative issues. Development at the site will utilize the City of Mankato's public water supply. The City's water system includes municipal wells, storage tanks/towers, and treatment facilities. Preliminary analysis indicates the City's water supply system has the capacity to meet the needs of the AUAR area for the foreseeable future. The City has already submitted an application to amend their DNR appropriations permit based on the future anticipated growth of the Mankato area. Additional amendments to the permit will be necessary as demands from development increase. The City of Mankato increased their water supply system capacity with the addition of two new wells in 2006. Well no. 15 is an additional Ranney vertical caisson with horizontal collector laterals that has been drilled, developed, and test pumped. Well house construction and pump installation are being bid at this time, and well no. 15 is expected to be in production in 2007. Well no. 16 is a 710-foot deep well. This well is currently in production and draws from the Mount Simon Hinckley aquifer.

The stormwater treatment facilities will be designed to reduce peak flow rates from existing conditions to pre-development conditions and reduce sedimentation, thus increasing the quality of water draining from the project area. With respect to stormwater management, the Minnesota Stormwater Manual was used extensively for potential BMP selection and design. The City plans to incorporate innovative Best Management Practices (BMP) into the overall stormwater management strategy for the AUAR area around the key concept of Low Impact Design. The traditional method for treatment of stormwater runoff is with stormwater ponds. Ponds will still be a necessary tool for stormwater management in this area for rate control and flood storage. The stormwater treatment facilities will be designed to reduce peak flow rates from existing conditions to pre-development conditions and reduce sedimentation, thus increasing the quality of water draining from the AUAR area. As far as treatment, however, other less traditional methods can be employed. These include the use of bio-retention, (things such as native landscaping and constructed wetlands) filtration, (vegetated swales, pervious pavement with underdrain system) and treatment structures (for sediment removal). These practices can be used in such a way as to be unobtrusive, or even attractive in the urban landscape. Designing and constructing stormwater treatment facilities to achieve the rate reduction goals will provide a responsible stormwater management system.

Portions of the AUAR area are identified for open space. These open spaces are either currently protected under the City of Mankato Ordinance for wetlands or woodlands, or have been set aside for regional stormwater facilities, community parks, passive recreational opportunities or wetland mitigation areas. There is a DNR protected water within the AUAR area which will be preserved and enhanced. The concepts for park and open space area, the integration of existing natural open spaces, and the proposed trails will include an interconnectivity within the AUAR area and will eventually link with current and future surrounding trails in Mankato, Eagle Lake, and the Sakatah State Trail to the north to provide an extensive pedestrian transportation system. A Parks and Open Space Plan has been developed as part of this AUAR and has been included for reference in Appendix H.

Road construction and improvements will occur as a result of development in the AUAR area. CSAH 12 will be extended starting to the north with an interchange at US Hwy 14 and continuing south to Trunk Highway (TH) 83 to accommodate future growth in the area. This area has previously undergone extensive study through the Mankato Area Transportation and Planning Study (MATAPS) completed in 1996 (and updated in 2003). The conceptual alignments provided in MATAPS were referenced for the AUAR area. The interchange at US Hwy 14 was studied as part of the Northeast Industrial Service Area AUAR (2005) located directly north of the AUAR area and a separate Environmental Assessment Worksheet (EAW) is underway for the CSAH 12 extension. New internal road alignments have been proposed for the extensions of Adams Street, Bassett Drive, and Hoffman Road (See Exhibit L—Transportation Plan). Additional collector roads will be necessary, but the final layout and locations have not been determined.

The City is aware that in order for this AUAR to remain valid as a substitute form of review, the environmental analysis document and the plan for mitigation must be revised if five years have passed since the City adopted the original environmental analysis document and plan for mitigation. Since the projected timeline for the project is greater than 5 years and is only in the conceptual stage of planning, the City is aware this AUAR document will need to be updated accordingly.

- c. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Recent development interest on the east side of the City of Mankato has warranted the preparation of this AUAR. Development is currently occurring in the adjacent areas along Madison Avenue and along the east side of TH 22. Landowners and developers have expressed an interest in the development of properties within the AUAR area, which will require new extensions of city infrastructure. The AUAR area has been receiving dual pressure being situation between the current city limits of Mankato and Eagle Lake. Since the AUAR area has a unique opportunity to include the preservation of significant environmental features including woodlands, wetlands, stream courses, and open space, as part of the AUAR process, the City of Mankato has added a master-planning design element to the AUAR study that has examined strategic locations for urban service nodes, park interconnections, walk-ability, open space preservation opportunities, and the development of alternative stormwater designs/standards. The incorporation of these elements into the AUAR will allow the AUAR to be adopted as part of Mankato's Land Use Plan as a specific sector plan. By doing this, it ensures a proactive master plan to help guide the area sustainably with a focus on environmental impact and mitigation opportunities rather than as a reactive approach to development.

The AUAR process is specifically being used to study this area in order to review incremental impacts accumulating from a series of sequential projects. This study focuses on development scenarios for an entire geographical area rather than a specific project. These scenarios were established utilizing information provided from the City of Mankato and Eagle Lake, Blue Earth County, the Mankato and Eagle Lake Land Use Maps, the Mankato Parks & Open Space Plan, the Mankato Area Transportation and Planning Study (MATAPS), the Northeast Industrial Service Area AUAR, stakeholder interviews, zoning ordinances and prospective development projects.

This project will be carried out by the City of Mankato and approval for development within the AUAR boundary will come from the City. There is an active real estate market and a steady demand for land in and adjacent to Mankato. Beneficiaries of the project will be the City, land owners within the AUAR area vicinity, developers, and commercial and industrial companies purchasing lots.

- d. Are future stages of this development including development on any outlots planned or likely to happen?

☒ Yes ☐ No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

All known development proposed and anticipated to occur is described and analyzed in this AUAR. The project is proposed in response to anticipated future regional growth as a regional center in South Central Minnesota. This question is being answered 'yes' because the entire development of the AUAR area is anticipated to occur in phases over a 25- to 50-year (or greater) period. New infrastructure and improvements to the existing infrastructure will be needed to accommodate future developments. The City of Mankato has undertaken intense comprehensive land use planning for anticipated growth. The purpose of this project is to take a proactive approach to planning and development in the area. It is anticipated that development will begin in 2007 and be phased over the next 25- to 50-years. However, the final development schedule will depend on market conditions.

Individual projects within this area will not be subject to individual environmental reviews if applicants conform to AUAR assumptions and mitigation plan requirements. Failure to conform exposes the individual projects to additional time delays and expenses, thereby encouraging projects to be designed in an environmentally conscientious manner. Regardless of any significant changes not encompassed by this review, the review must be updated every five years until all development in the area has been approved. Revisions to the documents are distributed for review in the same manner as for a final AUAR document.

According to Subpart 7 Updating the review, MN Rules 4410.3610, the environmental analysis document and the plan for mitigation must be revised if any of the circumstances in the following items apply:

- Five years have passed since the City adopted the original environmental analysis document and plan for mitigation or the latest revision. This item does not apply if all development within the area has been given final approval by the City.
- A comprehensive plan amendment is proposed that would allow an increase in development over the levels assumed in the environmental analysis document.
- Total development within the area would exceed the maximum levels assumed in the environmental analysis document.
- Development within any subarea delineated in the environmental analysis document would exceed the maximum levels assumed for that subarea in the document.
- A substantial change is proposed in public facilities intended to service development in the area that may result in increased adverse impacts on the environment.
- Development or construction of public facilities will occur on a schedule other than that assumed in the environmental analysis document or plan for mitigation so as to substantially increase the likelihood or magnitude of potential adverse environmental impacts or to substantially postpone the implementation of identified mitigation measures.
- New information demonstrates that important assumptions or background conditions used in the analysis presented in the environmental analysis document are substantially in error and that environmental impacts have consequently been substantially underestimated.
- The City determines that other substantial changes have occurred that may affect the potential for, or magnitude of, adverse environmental impacts.

e. Is this project a subsequent stage of an earlier project? ☐ Yes ☒ No

If yes, briefly describe the past development, timeline and any past environmental review.

## 7. Project magnitude data

**Project magnitude data.** The cumulative totals of the parameters called for should be given for each major development scenario, except that information on “manufacturing,” “other industrial,” “institutional,” and “agricultural.”

*No changes from the EAW form, except that the information should be given for each major development scenario.*

Total project acreage: ~2,100

### Land Use Scenario A.

Number of residential units: unattached: 2,096+ attached: 5,208+ maximum units per building: n/a

Commercial, industrial or institutional building area (gross floor space): total square feet: ~5,662,800<sup>1</sup>

Indicate areas of specific uses (in square feet):

**Table 7-1. Scenario A Land Use Estimated Units**

| SUB-DISTRICT AREA |                         | SCENARIO A. ESTIMATED UNITS |                      |
|-------------------|-------------------------|-----------------------------|----------------------|
| ID                | Proposed Land Use       | Gross Square Feet           | Projected # of Units |
| 1                 | Single Family           | -                           | 2,096                |
| 2                 | Multi Family            | -                           | 5,208                |
| 3                 | General Commercial      | 1,960,200                   | -                    |
| 4                 | Highway Commercial      | 1,001,880                   | -                    |
| 5                 | Civic/Institutional     | 261,360                     | -                    |
| 7                 | Neighborhood Commercial | 174,240                     | -                    |
| 12                | Mixed Office Commercial | 914,760                     | -                    |
| 14                | Industrial/Commercial   | 1,350,360                   | -                    |
| 16                | Open Space              | 0                           | -                    |
| <b>TOTAL</b>      |                         | <b>5,662,800 sq ft</b>      | <b>7,304 units</b>   |

Building height: no restrictions<sup>2</sup> If over 2 stories, compare to heights of nearby buildings: \_\_\_\_\_

<sup>1</sup>The types of Industrial use, whether it is warehouse, light industrial, manufacturing, or other industrial use located within the AUAR area is unknown at this time, but is required to meet the permitted and conditional uses of the designated zoning district.

<sup>2</sup>The maximum building height requirements for the City of Mankato lists ‘no restrictions’ under the current commercial and industrial land use districts.

### Land Use Scenario B.

Number of residential units: unattached: 3,020 + attached: 4,680 + maximum units per building: n/a

Commercial, industrial or institutional building area (gross floor space): total square feet: ~6,158,520<sup>1</sup>

**Table 7-2. Scenario B Land Use Estimated Units**

| SUB-DISTRICT AREA |                                | SCENARIO B. ESTIMATED UNITS |                      |
|-------------------|--------------------------------|-----------------------------|----------------------|
| ID                | Proposed Land Use              | Gross Square Feet           | Projected # of Units |
| 1                 | Single Family                  | -                           | 3,020                |
| 2                 | Multi Family                   | -                           | 2,640                |
| 3                 | General Commercial             | 696,960                     | -                    |
| 4                 | Highway Commercial             | 147,240                     | -                    |
| 5                 | Civic/Institutional            | 696,960                     | -                    |
| 6a                | Mixed Residential              | -                           | 510                  |
| 6b                | Retail                         | 740,520                     | -                    |
| 7                 | Neighborhood Commercial        | 217,800                     | -                    |
| 8a                | Neighborhood Commercial/Retail | 784,080                     | -                    |
| 8b                | Mixed Residential              | -                           | 1,530                |
| 11                | Office Industrial Campus       | 1,568,160                   | -                    |
| 14                | Industrial/Commercial          | 1,306,800                   | -                    |
| 16                | Open Space                     | 0                           | -                    |
| <b>TOTAL</b>      |                                | <b>6,158,520 sq ft</b>      | <b>7,700 units</b>   |

Building height: no restrictions<sup>2</sup> If over 2 stories, compare to heights of nearby buildings: \_\_\_\_\_

<sup>1</sup>The types of Industrial use, whether it is warehouse, light industrial, manufacturing, or other industrial use located within the AUAR area is unknown at this time, but is required to meet the permitted and conditional uses of the designated zoning district.

<sup>2</sup>The maximum building height requirements for the City of Mankato lists 'no restrictions' under the current commercial and industrial land use districts.

### **Land Use Scenario C.**

Number of residential units: unattached: 2,340 + attached: 3,545 + maximum units per building: n/a

Commercial, industrial or institutional building area (gross floor space): total square feet: ~6,316,200'

**Table 7-3. Scenario C Land Use Estimated Units**

| SUB-DISTRICT AREA |                             | SCENARIO A. ESTIMATED UNITS |                      |
|-------------------|-----------------------------|-----------------------------|----------------------|
| ID                | Proposed Land Use           | Gross Square Feet           | Projected # of Units |
| 1                 | Single Family               | -                           | 2,340                |
| 2                 | Multi Family                | -                           | 3,240                |
| 4                 | Highway Commercial          | 304,920                     | -                    |
| 5                 | Civic/Institutional         | 261,360                     | -                    |
| 6a                | Mixed Residential           | -                           | 305                  |
| 6b                | Retail                      | 435,600                     | -                    |
| 7                 | Neighborhood Commercial     | 174,240                     | -                    |
| 9                 | Park                        | 0                           | -                    |
| 10                | Lifestyle Center Commercial | 130,680                     | -                    |
| 11                | Office Industrial Campus    | 1,437,480                   | -                    |
| 12                | Mixed Office Commercial     | 914,760                     | -                    |
| 13                | Office/Tech Flex Space      | 392,040                     | -                    |
| 14                | Industrial/Commercial       | 2,090,880                   | -                    |
| 15                | School                      | 174,240                     | -                    |
| 16                | Open Space                  | 0                           | -                    |
| <b>TOTAL</b>      |                             | <b>6,316,200 sq ft</b>      | <b>5,885 units</b>   |

Building height: no restrictions<sup>2</sup> If over 2 stories, compare to heights of nearby buildings: \_\_\_\_\_

<sup>1</sup>The types of Industrial use, whether it is warehouse, light industrial, manufacturing, or other industrial use located within the AUAR area is unknown at this time, but is required to meet the permitted and conditional uses of the designated zoning district.

<sup>2</sup>The maximum building height requirements for the City of Mankato lists 'no restrictions' under the current commercial and industrial land use districts.

According to Mankato's Zoning Ordinance, Chapter 10, Land Use (Zoning), the City has the following districts that may be applicable to one or more sections the AUAR Area:

- R-1 One-Family Dwelling
- R-2 One & Two Family Dwelling
- R-3 Limited Multiple Dwelling
- OR Office Residential
- B-3 Highway Business District
- PI Planned Industrial District
- M-1 Industrial District
- I-0 Institutional Overlay
- O Office District
- GT Gateway Overlay Districts (commercial gateway district, highway gateway overlay district, neighborhood node gateway overlay district)

The current City of Mankato Zoning Map is included to show surrounding zoning classifications (See Exhibit F—Mankato Zoning Map).

Additional districts may need to be added to the current Zoning Ordinance and/or language amended to allow for the more sustainable design practices, traditional neighborhood design, and the mixed land uses desired within the AUAR area, including mixed residential/retail, neighborhood commercial, lifestyle center commercial, office industrial campus, and office/tech flex space.

#### **8. Permits and approvals required.**

List all known local, state and federal permits, approvals and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure.

**Permits and approvals required.** *A listing of major approvals and public financial assistance and infrastructure likely to be required by the anticipated types of development projects should be given. This list will help orient reviewers to framework that will protect environmental resources. The list can also serve as a starting point for the development of the implementation aspects of the mitigation plan to be developed as part of the AUAR.*

All required permits and approvals will be obtained. Any necessary permits or approvals that are not listed in the table below were not intentionally omitted.

**Table 8-1. Permits Required**

| Unit of Government                                 | Type of Application   | Status             |
|--|---|--------------------|
| <b>FEDERAL</b>                                     |   |                    |
| Army Corps of Engineers                            | Section 404 CWA   | Future submittal   |
| <b>STATE</b>                                       |   |                    |
| Minnesota Department of Health (MDH)               | Watermain Plan Review   | Future submittal   |
| Minnesota Pollution Control Agency (MPCA)          | Stormwater Construction Activity NPDES Permit                     | Future submittal   |
|  | Sanitary Sewer  | Future submittal   |
|  | Indirect Source Permit  | Possible submittal |
|  | Sanitary Sewer Extensions and/or Changes Permit                   | Future submittal   |
|  | Wastewater permit   | Future submittal   |
|  | 401 Water Quality Certificate <sup>1</sup>                        | Future Submittal   |
| MnDOT  | Road Access Permit  | Future submittal   |
| MnDOT  | Utility Permit  | Future submittal   |
| State Historic Preservation Office (SHPO)          | Cultural Resources Review   | Completed          |
| Minnesota Department of Natural Resources (MN DNR) | Natural Heritage Program Threatened and Endangered Species Review | Completed          |
|  | Stormsewer Discharge Permit                                       | Future submittal   |
|  | Water Appropriations Permit                                       | Future submittal   |
|  | Public Waters Work Permit   | Future submittal   |
| <b>LOCAL</b>                                       |   |                    |
| Blue Earth County                                  | Utility Permit  | Future submittal   |
|  | Access Permit   | Future submittal   |
| Mankato Twp  | Road Access Permit  | Future submittal   |
|  | Orderly Annexation Agreement                                      | Future submittal   |
| City of Mankato                                    | Rezoning  | Future submittal   |
|  | Sanitary Sewer  | Future submittal   |
|  | Subdivision Permits   | Future submittal   |
|  | Grading Permit  | Future submittal   |
|  | Building Permits  | Future submittal   |
|  | Wetland Conservation Act  | Future submittal   |
|  | AUAR  | Pending            |
|  | Economic Development Funds  | Pending            |
|  | Comprehensive Plan Amendment                                      | Future submittal   |

<sup>1</sup>Under the Clean Water Act, the Section 201 Certification process requires the MPCA to ensure projects required to obtain a Section 404 Permit from the Corps of Engineers will comply with the state water quality standards in Minn. R. Ch. 7050 and any conditions required by the MPCA 401 Certification will be incorporated into the Corps 404 Permit.

## 9. Land use.

Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

### Current & Recent Past Land Use

Please note: The summary of existing and past land uses and potential land use conflicts is included in greater depth in the response to Items 6 and 10.

This area was converted to agricultural land use from historical presettlement vegetation information showing the majority of the AUAR area as Big Woods – Hardwoods (oak, maple, basswood, hickory) with portions as wet prairie. The northeast corner of Blue Earth County is part of the western edge of the Big Woods. Most of the remainder of the County is prairie and wet prairie. The Big Woods also extends south along the Le Sueur, Blue Earth, and Watonwan Rivers. Presettlement maps show the large existing wetland within the AUAR area along with two, comparatively sized wet prairie areas.

The majority of the current land use on the AUAR area is agricultural with sections of woodland and wetland. There are also rural residential homesteads located within the AUAR boundary. The following information lists the number of current residential and

commercial/industrial land uses within each sub-district as shown in Exhibit C—AUAR Boundary Map):

**Table 9-1. Current Land Use**

| Subdistricts | Rural Residential Homesteads (amount) | Commercial/Industrial (amount, name)                        |
|--------------|---------------------------------------|---|
| A            | 2<br>(1 abandoned)                    |   |
| B            | -                                     | -   |
| C            | 1                                     |   |
| D            | 2<br>(1 abandoned)                    |   |
| E            | 1                                     | 3<br>KTOE Radio station, Javen's Electric, Javen's Plumbing |
| F            | -                                     | -   |
| G            | -                                     | -   |
| H            | 1                                     | communications tower/storage bldg                           |
| I            | 2                                     | -   |
| J            | 1                                     | -   |
| K            | 3                                     | -   |
| L            | 3<br>(1 abandoned farmsite)           | -   |
| M            | 1                                     | substation  |
| N            | 4                                     | -   |
| O            | 2                                     | -   |
| P            | 4                                     | -   |
| Q            | 3                                     | -   |
| R            | 2                                     | -   |

There are no indications that this site has ever had industrial activity on the site. There are no known potential conflicts involving environmental matters or environmental hazards due to past site uses.

#### **Adjacent Land Use Compatibility**

Surrounding land use is slowly shifting away from rural uses to urban development. Land uses adjacent to the AUAR area include US Highway 14 to the north with agricultural use and open space to the north and east, MN Trunk Highway (TH) 83 to the south with agricultural use beyond, and the current Mankato City Limits with commercial and residential use to the west, (see Exhibit D—Existing Land Use Plan). The Mankato Land Use Plan Map (Updated April 2005) identifies commercial, industrial and residential use adjacent to the AUAR area to the north and west, with agricultural preservation area to the east and south. The project is compatible with the extension of existing and proposed adjacent land uses. There is no known potential land use conflicts associated with existing land uses within the general Project area.

#### **Potential Environmental Hazards**

The identification of any existing areas of soil contamination is included under item 19.

There are three major gas pipelines that exist on the site and are shown in Exhibit H—Existing Conditions Map. One of the pipelines runs north and south through the middle of the site. The pipeline runs underneath US Hwy 14, through the large wetland complex in the middle of the site, then south past TH 83. The other two gas pipelines are located in the northeastern most corner of the site. The pipeline runs northwest/southeast underneath US Hwy 14 to CSAH 17, where it continues to the tank farm located in the southeast quadrant of the CSAH 17 and CR-86 intersection, then continues southeast just east of the site. Official land uses and zoning will need to be addressed if development is scheduled to occur within the vicinity of the tank farm because of safety and potential emergency situations associated with gas leaks and/or explosions. The areas of pipeline easement will remain as open space and will most likely have numerous road intersections.



There are no known past or potential conflicts involving environmental concerns or environmental hazards due to these pipelines. However, while the area develops, these pipelines will most likely require additional safety measures be installed along the pipeline.

### Projected Land Use

The Future Land Use maps show three separate scenarios for development within the AUAR area. Scenario A replicates the current Mankato Land Use Plan Map and the Mankato Area Transportation and Planning Study (MATAPS) within areas covered by the current plans, and includes a projection of the land uses in the areas not covered by the current plans. Land Use Scenario B includes mixed-use land designations and higher densities than Scenario A. Scenario C expands on the mixed-use of Scenario B by increasing the land use densities and focusing densities around multi-modal nodes and alternative forms of transportation.

It is assumed that approximately one-fourth of the total acreage of the AUAR area will be preserved, enhanced, and/or utilized for natural resources, including: wetland preservation, stormwater facilities, wetland mitigation, and parks and open space, which equals approximately 460 acres. All of the sub-district areas could include public infrastructure such as roads or regional stormwater facilities, or development. The City did not use the AUAR process to evaluate the potential for development of each parcel of property, but rather to identify the environmental impacts associated with the 'most intensive scenario' for certain land use development scenarios. Even if portions of a sub-district cannot be developed because of potential wetland areas or other factors this does not mean the entire sub-district is unavailable for development.

All areas within the AUAR area will need to meet wetland regulatory requirements, along with all other City ordinances. This AUAR is being utilized estimate a 'worst-case scenario' development plan which also utilizes a floor-area-ratio to project actual build-out. As part of the traffic, air and noise analysis projections, build-out of the AUAR area (although highly aggressive) was forecasted to the year 2030 for the analysis.

**Table 9-2. Scenario C. Land Use by Sub-District**

| Land Use    |                             | Sub-District (in acres) |    |     |    |     |    |    |     |    |     |    |     |     |     |     |     |     |    |
|-------------|-----------------------------|-------------------------|----|-----|----|-----|----|----|-----|----|-----|----|-----|-----|-----|-----|-----|-----|----|
|             |                             | A                       | B  | C   | D  | E   | F  | G  | H   | I  | J   | K  | L   | M   | N   | O   | P   | Q   | R  |
| 1           | Single Family Residential   |                         |    |     |    | 30  | 10 | 23 | 49  |    | 8   | 17 | 127 | 35  | 32  | 79  | 85  | 54  | 38 |
| 2           | Multi Family Residential    |                         |    |     |    |     | 4  |    | 59  | 51 | 4   | 46 |     | 32  | 2   | 33  | 30  | 11  |    |
| 4           | Highway Commercial          |                         | 5  | 44  |    |     |    |    |     |    |     |    |     |     |     |     |     |     |    |
| 5           | Civic/School/Institutional  |                         |    |     | 22 |     |    |    |     | 17 | 2   |    |     | 2   | 33  |     |     |     |    |
| 6<br>a & b  | Mixed Residential/Retail    |                         |    |     |    |     |    |    | 11  | 5  |     |    |     | 14  |     |     |     |     |    |
| 7           | Neighborhood Commercial     |                         |    |     |    |     |    |    |     |    |     |    |     | 12  |     |     | 7   |     |    |
| 9           | Park                        |                         |    |     |    |     |    |    |     |    |     |    |     |     | 9   | 26  |     | 7   |    |
| 10          | Lifestyle Center Commercial |                         |    |     |    |     |    |    |     |    | 17  |    |     |     |     |     |     |     |    |
| 11          | Office Industrial Campus    |                         |    |     | 30 | 44  |    |    |     |    | 76  | 14 |     |     |     |     |     |     |    |
| 12          | Mixed Office Commercial     | 44                      |    |     |    |     |    |    | 8   |    |     |    |     |     |     |     |     |     |    |
| 13          | Office/Tech/Flex Space      |                         |    |     |    |     |    |    | 34  |    |     |    |     |     |     |     |     |     |    |
| 14          | Industrial/Commercial       | 111                     | 82 | 51  |    | 24  |    |    |     |    |     |    |     |     |     |     |     |     |    |
| 16          | Open Space                  |                         |    |     |    | 20  | 20 | 73 | 43  | 12 |     | 1  |     | 53  | 50  | 46  |     | 142 |    |
| TOTAL ACRES |                             | 155                     | 87 | 106 | 52 | 118 | 34 | 96 | 204 | 85 | 107 | 78 | 127 | 148 | 126 | 191 | 122 | 214 | 38 |

The City also requires a formal wetland investigation be conducted, submitted, and approved prior to starting the preliminary platting process occurs throughout all portions of the City. One thing to note, when the land use plan identifies a certain type of development in an area, this does not warrant permission from the City allowing development throughout the entire area. Exhibit E outlines a land use plan, not a rule or ordinance for development scenarios. Within these development scenarios, the City reserves the right to set aside areas as natural areas, wetland preservation areas, potential wetland mitigation area, and public open space. Each subsection may also include development in the future, which is also reflected in the exhibits.

The City is also aware that in order for the AUAR to remain valid as a substitute form of review, the environmental analysis document and the plan for mitigation must be revised if five years have passed since the City adopted the original environmental analysis document and plan for mitigation. Since the projected timeline for the project is greater than five years and is only in the conceptual stage of planning, the City is aware this AUAR document will need to be updated in the future.

## 10. Cover types.

Estimate the acreage of the site with each of the following cover types before and after development:

**Cover types.** *The following information should be provided instead:*

- a. *cover type map, at least at the scale of a USGS topographic map, depicting:*
  - wetlands – identified by type (Circular 39)
  - watercourses – rivers, streams, creeks, ditches
  - lakes – identify protected waters status and shoreland management classification
  - woodlands – breakdown by classes where possible
  - grassland – identify native and old field
  - cropland
  - current development
- b. *an "overlay" map showing anticipated development in relation to the cover types; this map should also depict any "protection areas," existing or proposed, that will preserve sensitive cover types. Separate maps for each major development scenario should generally be provided.*

**Table 10-1. Existing Cover Types**

| Number                                      | Cover Type Classification  | Acres Before Development |
|---|--|--------------------------|
| <b>Agricultural</b>                         |  |                          |
| 24110                                       | Upland Soils – Cultivated Row Cropland                                 | 170.52                   |
| 24120                                       | Hydric Soils – Cultivated Row Cropland                                 | 1,368.9                  |
| 24228                                       | Hydric Soils – Close Grown Cropland (Hayfield)                         | 36.56                    |
| <b>Residential &amp; Impervious Surface</b> |  |                          |
| 14000                                       | Artificial Surfaces with less than 25% Vegetative Cover                | 4.4                      |
| 21100                                       | Planted, Maintained, or Cultivated Coniferous Trees                    | 9.3                      |
| 23100                                       | Planted or Maintained Grasses with Sparse Trees                        | 82.17                    |
| <b>Grasslands</b>                           |  |                          |
| 61220                                       | Medium – Tall Altered/Non-native Dominated Grassland                   | 2.85                     |
| 61330                                       | Temporarily Flooded Altered/Non-native Dominated Grassland             | 32.64                    |
| 62000                                       | Grassland with Sparse Trees  | 23.8                     |
| 62140                                       | Non-native Dominated Herbaceous Vegetation with Sparse Deciduous Trees | 6.9                      |
| <b>Shrublands</b>                           |  |                          |
| 52130                                       | Non-native Dominated Upland Shrubland                                  | 1.01                     |
| <b>Woodlands</b>                            |  |                          |
| 32150                                       | Maple-Basswood Forest  | 36.8                     |
| 32170                                       | Altered/Non-native Deciduous Forest                                    | 19.94                    |
| 32200                                       | Temporarily Flooded Deciduous Forest                                   | 37.75                    |
| 32220                                       | Lowland Hardwood Forest  | 43.85                    |
| 32240                                       | Altered/Non-native Temporarily Flooded Deciduous Forest                | 15.3                     |
| 32340                                       | Altered/Non-native Deciduous Forest – Saturated Soil                   | 8.7                      |
| <b>Wetlands/Open Water</b>                  |  |                          |
| 61480                                       | Saturated Altered/Non-native Herbaceous Vegetation                     | 58.41                    |
| 61520                                       | Mixed Emergent Marsh – Seasonally Flooded                              | 0.44                     |
| 61530                                       | Seasonally Flooded Altered Non-native Dominated Herbaceous Vegetation  | 35.31                    |
| 61630                                       | Semi-permanently Flooded Altered/Non-native Herbaceous Vegetation      | 1.22                     |
| 93300                                       | Palustrine Open Water  | 12.49                    |
| <b>TOTAL</b>                                |  | <b>~2,100 acres</b>      |

<sup>1</sup> The estimated amount of wetlands within the AUAR boundary is unknown given a wetland investigation has not been completed. While the amount of wetland area to remain under each scenario is also unknown, it is assumed that since impacts to these wetlands must be avoided when prudent and feasible alternatives exist, that the amount of wetlands currently located within the project area and the amount of wetlands remaining in each scenario will be similar. For more information regarding wetland investigations, permitting, and mitigation, please see item 12.

The AUAR area consists of various land cover types with the majority of land used for cultivated row cropland. A Land Cover Classification Inventory was completed by I&S Engineers & Architects, Inc. to determine cover types in the AUAR area. The MN DNR's Minnesota Land Cover Classification System (MLCCS) was utilized for the inventory. The land cover typing was completed utilizing walk-through inventories, road inventories, and/or review of aerial photographs, soils maps, and/or National Wetland Inventory maps. 22 land cover types were identified throughout the AUAR area. However, not all areas were surveyed by the walk-through method because access privileges were not granted for all parcels. Information gathered from adjacent properties, in correlation with aerial photograph and map review, has provided projection of land cover types that is sufficiently accurate for this AUAR.

A description of each cover type included in the table above is provided in Appendix F— Natural Resources Assessment Inventory along with the methods utilized during the inventory. A map has also been included showing the existing cover types (Exhibit G— Cover Type Map).

The largest land cover change that will occur within the AUAR area will be from a decrease of agriculture use to an increase in impervious surfaces. The new impervious surfaces will include roads, sidewalks, trails, buildings, driveways and parking area.

#### **11. Fish, wildlife and ecologically sensitive resources**

- a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

The largest impact to fish, wildlife, and ecologically sensitive resources occurs from habitat loss and habitat fragmentation as land development occurs. Habitat loss is one of the most significant impact urbanization has on plants and animals. Conversion of agricultural fields and natural vegetation to urban development is expected to result in a decline in the type and number of wildlife species that currently inhabit this site. Loss of suitable habitat can result from physical landscape modification with impervious surfaces, urban grasses and shrubs. There is also potential for wildlife displacement due to habitat loss. A common misconception is that wildlife will be relocated to other areas. Habitat is usually saturated (ie at carrying capacity) for most wildlife species if populations are in balance. In fact, it is more likely that wildlife impacts will be greater than presumed as displaced animals will put stress on neighboring established animals as the displaced individuals disperse. The dispersing animals are more likely to suffer increased mortality or not become part of the breeding population than they are to find a vacant territory and reproduce.

Another way that urbanization can affect wildlife is by fragmenting the natural habitat areas. This reduces the travel corridors necessary to some wildlife for escape routes and to reach food, water, and shelter.

#### **Wildlife Resources & Habitat Types**

The AUAR area includes twenty two (22) individual cover types based on the Minnesota Land Cover Classification System (MLCCS) developed by the Minnesota Department of Natural Resources (MN DNR). Due to the adaptive ability of various wildlife species, the 22 cover types have been focused into six general land cover groups including; Woodland/Forest, Lawn/Short Grass, Cropland, Herbaceous Wetland/Open Water, Shrubland, and Grassland.

It is also worth noting that the large vegetated areas throughout the AUAR area could potentially be part of a natural corridor stretching from south of the site to the northeast to Eagle Lake and beyond. This area has large wetland complexes including woodland and grassland areas that are prime habitat for many wildlife species.

Information has also been provided in this section to include wildlife known to inhabit the area but not necessarily observed during the site visit.

Woodland/Forest: The Woodland/Forest habitat category refers to a variety of primarily deciduous woodland and forest cover types identified within the AUAR area. All woodland and forest habitats supply cover for a number of wildlife species. Woodlands with greater plant species diversity and greater vertical diversity will provide higher quality wildlife habitat. Woodlands and forests with higher tree species diversity will provide a more stable forage base for the wildlife species present. Areas with multi-level vertical structure vs. minimal vertical structure habitats (i.e. habitat with herbaceous, shrubs, samplings, and upper canopy vs. habitat with only herbaceous and upper canopy) will provide greater cover availability for more wildlife species.

Lawn/Short Grass: The lawn/short grassland areas are introduced grass and legumes. The short grasslands refer to hay or pasture lands. Some wildlife species benefit from these areas, and period disturbance of mowing tends to encourage the presence of these species. Generally short grasslands habitat types provide good nesting cover and forage

areas for grounding nesting bird species, but if mowing is too frequent during the nesting season (Mid April – August) the use of these habitats will be of minimal significance.

Cropland: Agricultural land can serve as a temporary cover and food source for numerous species of wildlife. The benefits of agricultural ground to wildlife is dependent upon the presence of other permanent habitat types mixed within the cropland.

Herbaceous Wetland/Open Water: Wetlands serve as a source of water and food for almost every wildlife species. Amphibian species present within the AUAR area are completely dependent upon the presence and quality of the various wetland communities. Wetland communities provide cover to a number of different species throughout the year; as the hydrologic conditions change, so will the wildlife species present. During the wet portion of the growing certain herbaceous wetland types are inundated and provide habitat for amphibians and waterfowl. Later in the growing season that same wetland may experience a “draw down”, and the resulting conditions of little or no water will be ideal for various mammals and bird species to take advantage of the cover and forage base.

Shrubland: The scrub-shrublands present within the AUAR area are primarily dominated by non-native species within the shrub layer and/or the herbaceous layer where present. These areas provide cover and forage for various wildlife species, but the dominance by non-native species limits the quality of these habitat areas.

Grassland: The wildlife species that occupy the grassland habitats will vary depending on the dominant vegetative cover. Areas of greater native grass and forb diversity will provide greater wildlife benefit by producing a wider variety of seeds and by attracting a greater forage base of insects for small mammals and ground nesting birds. This increase in potential prey species will lead to greater utilization of the habitat by predator species. Areas dominated by introduced grass species will tend to be a monotypical grass species community with minimal forage and cover potential.

Refer to the Land Cover Types section of this report for a detailed description of the cover types present within the AUAR area, and the methods used to identify the cover types. The table that follows identifies the wildlife species that may utilize the habitat types within the AUAR area. Wildlife species identified during the walk through surveys conducted by I&S have also been indicated.

### **Fish**

The AUAR area includes some intermittent streams and agricultural drainage ditches which could potentially support fish species. However, due to poor water quality from agricultural runoff and the intermittent nature of these streams and ditches, the diversity and number of fish species is most likely limited to more tolerant minnow species. Some of these potential species may include the common shiner, white sucker, and common creek chub.

### **Wildlife**

A wildlife survey was conducted at the site August – September, 2006. The response to this section is based on this survey. During this inventory no threatened or endangered wildlife species were immediately identified. The following species have been categorized based on the land cover types within the AUAR area.

**Table 11-1. Wildlife Survey**

| Species                    | Woodland/Forest | Lawn/Short Grass | Cropland | Herbaceous Wetland/Open Water | Shrubland | Grassland |
|----------------------------|-----------------|------------------|----------|-------------------------------|-----------|-----------|
| White-tailed Deer          | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Fox Squirrel               | ✓               | ✓                | ✓        | ✓                             |           |           |
| Pine Squirrel              | ✓               | ✓                |          |                               |           |           |
| Grey Squirrel              | ✓               | ✓                | ✓        |                               |           |           |
| Short-tail Shrew           |                 |                  |          | ✓                             |           | ✓         |
| Striped Skunk              |                 | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Jack Rabbit                |                 |                  | ✓        | ✓                             | ✓         | ✓         |
| 13-lined ground squirrel   |                 | ✓                | ✓        |                               |           | ✓         |
| Franklin's Ground squirrel |                 |                  |          |                               |           | ✓         |
| Eastern Chipmunk           | ✓               |                  |          |                               | ✓         |           |
| Red Fox                    |                 |                  |          | ✓                             |           | ✓         |
| Grey Fox                   | ✓               |                  |          |                               | ✓         |           |
| Cottontail Rabbit          | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| White-footed Mouse         |                 | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Deer Mouse                 | ✓               |                  |          |                               | ✓         |           |
| House Mouse                |                 |                  | ✓        |                               |           |           |
| Meadow Jumping Mouse       |                 |                  |          | ✓                             |           | ✓         |
| Western Harvest Mouse      |                 |                  |          |                               |           | ✓         |
| Raccoon                    | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Opossum                    | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Woodchuck                  |                 | ✓                | ✓        |                               |           |           |
| Mink                       |                 |                  |          | ✓                             |           |           |
| Muskrat                    |                 |                  |          | ✓                             |           |           |
| Beaver                     |                 |                  |          | ✓                             |           |           |
| Meadow Vole                |                 |                  |          | ✓                             |           | ✓         |
| Prairie Vole               |                 |                  |          |                               |           | ✓         |
| Least Weasel               |                 |                  |          | ✓                             | ✓         | ✓         |
| Coyote                     |                 | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Plains Pocket Gopher       |                 | ✓                | ✓        |                               |           | ✓         |
| Short-tailed Weasel        | ✓               |                  | ✓        | ✓                             | ✓         | ✓         |
| Long-tailed Weasel         | ✓               |                  | ✓        | ✓                             | ✓         | ✓         |
| Least Shrew                | ✓               |                  |          | ✓                             |           | ✓         |
| Masked Shrew               | ✓               |                  |          |                               |           | ✓         |
| Short-tailed Shrew         | ✓               |                  |          |                               |           |           |
| Little Brown Myotis        | ✓               |                  |          |                               |           |           |
| Eastern Red Bat            | ✓               |                  |          |                               |           |           |
| Hoary Bat                  | ✓               |                  |          |                               |           |           |
| Silver-haired Bat          | ✓               |                  |          |                               |           |           |
| Eastern Pipistrelle        | ✓               |                  |          |                               |           |           |
| Big Brown Bat              | ✓               |                  |          |                               |           |           |
| Upland Sanpiper            |                 |                  |          |                               |           | ✓         |
| Gray Partridge             |                 |                  | ✓        |                               |           |           |
| Black-capped Chickadee     | ✓               |                  |          |                               |           |           |
| Turkey Vulture             | ✓               |                  |          |                               |           |           |
| Cooper's Hawk              | ✓               |                  |          |                               |           |           |
| Eastern Screech Owl        | ✓               |                  |          |                               |           |           |
| Barn Owl                   | ✓               |                  |          |                               |           | ✓         |

| Species                   | Woodland/Forest | Lawn/Short Grass | Cropland | Herbaceous Wetland/Open Water | Shrubland | Grassland |
|---------------------------|-----------------|------------------|----------|-------------------------------|-----------|-----------|
| Black-billed Cuckoo       | ✓               |                  |          |                               | ✓         |           |
| Red-bellied Woodpecker    | ✓               |                  |          |                               |           |           |
| Red-headed Woodpecker     |                 | ✓                |          |                               |           |           |
| Yellow-bellied Sapsucker  | ✓               |                  |          |                               |           |           |
| Whip-poor-will            | ✓               |                  |          |                               |           |           |
| Long-eared Owl            | ✓               |                  |          |                               |           |           |
| Ruby Throated Hummingbird | ✓               |                  |          |                               |           |           |
| Northern Cardinal         | ✓               |                  |          |                               | ✓         |           |
| Red-tailed Hawk           | ✓               | ✓                | ✓        | ✓                             | ✓         |           |
| Wild Turkey               | ✓               | ✓                | ✓        | ✓                             | ✓         |           |
| Great Horned Owl          | ✓               | ✓                | ✓        | ✓                             |           |           |
| Gray Catbird              |                 |                  |          |                               | ✓         |           |
| American Crow             | ✓               | ✓                | ✓        | ✓                             | ✓         |           |
| American Coot             |                 |                  |          | ✓                             |           |           |
| American Kestrel          |                 | ✓                | ✓        |                               |           |           |
| American Robin            | ✓               | ✓                |          |                               | ✓         |           |
| American Goldfinch        |                 | ✓                |          |                               |           |           |
| American Snipe            |                 |                  |          | ✓                             |           |           |
| Blue Jay                  | ✓               | ✓                |          |                               | ✓         |           |
| Common Grackle            |                 | ✓                | ✓        | ✓                             | ✓         |           |
| Common Pigeon             |                 | ✓                |          | ✓                             |           | ✓         |
| Downy Woodpecker          | ✓               |                  |          |                               |           |           |
| European Starling         |                 | ✓                |          |                               | ✓         |           |
| Hairy Woodpecker          | ✓               |                  |          |                               |           |           |
| House Sparrow             |                 | ✓                | ✓        | ✓                             | ✓         |           |
| House Wren                |                 |                  | ✓        |                               |           |           |
| Pileated Woodpecker       | ✓               |                  |          |                               |           |           |
| Purple Finch              |                 | ✓                |          |                               |           |           |
| Mourning Dove             |                 | ✓                | ✓        | ✓                             | ✓         |           |
| Northern Oriole           | ✓               | ✓                |          |                               |           |           |
| Northern Flicker          |                 | ✓                |          |                               |           |           |
| Northern Cardinal         |                 | ✓                |          |                               |           |           |
| Rose-breasted Grosbeak    | ✓               |                  |          |                               |           |           |
| American Redstart         | ✓               |                  |          |                               |           |           |
| American Bittern          |                 |                  |          | ✓                             |           |           |
| Virginia Rail             |                 |                  |          | ✓                             |           |           |
| Red-eyed Vireo            | ✓               |                  |          |                               |           |           |
| Trumpeter Swan            |                 |                  |          | ✓                             |           |           |
| Great Blue Heron          |                 |                  |          | ✓                             |           |           |
| Eastern Kingbird          |                 |                  |          |                               |           | ✓         |
| Upland Sandpiper          |                 |                  |          |                               |           | ✓         |
| Bluebills                 |                 |                  |          | ✓                             |           |           |
| Wood Thrush               | ✓               |                  |          |                               |           |           |
| Golden Crowned Kinglet    | ✓               |                  |          |                               |           |           |
| Loggerhead Shrike         |                 |                  |          |                               |           | ✓         |
| Purple Martin             | ✓               |                  | ✓        |                               |           |           |
| Eastern Meadowlark        |                 |                  |          |                               |           | ✓         |

| Species                 | Woodland/Forest | Lawn/Short Grass | Cropland | Herbaceous Wetland/Open Water | Shrubland | Grassland |
|-------------------------|-----------------|------------------|----------|-------------------------------|-----------|-----------|
| White Breasted Nuthatch | ✓               |                  |          |                               |           |           |
| Scarlet Tanager         | ✓               |                  |          |                               |           |           |
| Mallard                 |                 |                  | ✓        | ✓                             |           | ✓         |
| Wood Duck               | ✓               |                  | ✓        | ✓                             |           | ✓         |
| Brown-headed Cowbird    |                 |                  | ✓        |                               |           |           |
| Canada Goose            |                 |                  | ✓        | ✓                             |           |           |
| European Starling       |                 |                  | ✓        | ✓                             |           | ✓         |
| Snow Goose              |                 |                  | ✓        | ✓                             |           |           |
| Pintail                 |                 |                  | ✓        | ✓                             |           |           |
| Blue-Wing Teal          |                 |                  | ✓        | ✓                             |           |           |
| Green-Wing Teal         |                 |                  | ✓        | ✓                             |           | ✓         |
| Ringneck Pheasant       |                 |                  | ✓        | ✓                             | ✓         | ✓         |
| Common Pigeon           |                 |                  | ✓        | ✓                             |           |           |
| N. Harrier Marsh Hawk   |                 |                  |          | ✓                             |           | ✓         |
| Red-Winged Blackbird    |                 |                  | ✓        | ✓                             |           |           |
| Yellow-Headed Blackbird |                 |                  | ✓        |                               |           | ✓         |
| Killdeer                |                 |                  |          |                               | ✓         | ✓         |
| Pie-billed Grebe        |                 |                  | ✓        |                               |           |           |
| Turkey Vulture          |                 |                  | ✓        | ✓                             |           | ✓         |
| Barn Owl                |                 |                  | ✓        |                               |           |           |
| Barn Swallow            |                 |                  | ✓        | ✓                             |           |           |
| Tree Swallow            |                 |                  |          | ✓                             |           |           |
| American Egret          |                 |                  | ✓        | ✓                             |           |           |
| Marsh Wren              |                 |                  | ✓        | ✓                             |           |           |
| Sedge Wren              |                 |                  |          | ✓                             |           |           |
| Blackduck               |                 |                  |          | ✓                             |           | ✓         |
| Canvasback              |                 |                  |          | ✓                             |           |           |
| Northern Shoveler       |                 |                  |          | ✓                             |           |           |
| Sora                    |                 |                  |          | ✓                             |           |           |
| Brown Thrasher          |                 |                  |          | ✓                             |           |           |
| Spring Beeper           |                 |                  |          | ✓                             |           | ✓         |
| Dickcissel              |                 |                  |          |                               |           |           |
| Northern Leopard Frog   | ✓               | ✓                |          | ✓                             |           | ✓         |
| Western Chorus Frog     |                 |                  |          |                               |           | ✓         |
| Grey Tree Frog          | ✓               | ✓                |          | ✓                             |           |           |
| Spring Beeper           | ✓               |                  |          | ✓                             |           |           |
| American Toad           | ✓               | ✓                |          | ✓                             |           | ✓         |
| Western Chorus Frog     | ✓               |                  |          | ✓                             |           |           |
| Tiger Salamander        | ✓               |                  |          |                               |           |           |
| Painted Turtle          |                 |                  |          | ✓                             |           |           |
| Common Garter Snake     | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Plains Garter Snake     |                 |                  | ✓        | ✓                             |           | ✓         |
| Fox Snake               | ✓               | ✓                |          |                               |           |           |
| Redbelly Snake          | ✓               |                  |          |                               |           |           |
| Brown Snake             | ✓               | ✓                |          |                               |           |           |
| Green Snake             |                 |                  |          |                               |           | ✓         |
| Northern Leopard Frog   | ✓               | ✓                |          | ✓                             |           | ✓         |

The shading within the columns indicates the species was observed in the corresponding habitat type within the AUAR area. Observation criteria included, (but were not limited to), scat, tracks, feathers, hairs, skeletal remains, vegetative cuttings, scrapes, rubs, foraging sign, nests, beds, and/or dens.

The Minnesota Department of Natural Resources does not list any special concern, threatened, or endangered species on or adjacent to the Project area (see question 11b).

However, all natural areas and wildlife species throughout the AUAR area will be sensitive to changes in the current conditions. However, from an ecological perspective, the cover types throughout the AUAR area are not rare habitats. The current land use consisting mainly of agricultural use provides habitat and corridor connections to surrounding vegetated areas. Development within the AUAR area will possibly fragment these corridors, decreasing connections to natural areas, and in turn, potentially put stress on wildlife that inhabit the area. The following strategies are proposed to help mitigate potential impacts to wildlife habitat.

### **Mitigation**

Measures to reduce the effects on wildlife include wetland preservation, park and open space dedication, and construction of stormwater ponding. Land Use Scenario C provides a large amount of connected 'open space' with significant widths and buffers to natural areas which will help to maintain some habitat for wildlife and nominally mitigate adverse effects from this project. A Parks and Open Space Plan has also been developed (Appendix H) which addresses the park and recreational needs and open space preservation efforts and greenway connections of the project area.

All wetlands identified on the site will be administered in accordance to the 1991 Minnesota Wetland Conservation Act (WCA) and the Clean Water Act Section 404 administered by the Army Corps of Engineers. The WCA and city ordinance requires a project go through the sequencing process before the project is reviewed. For more information regarding wetland investigation, permitting, and mitigation, please see Item 12.

The Blue Earth County Greenprint Program will be an initiative that, when finished, will help preserve natural resources throughout Blue Earth County and Mankato. It is intended to bring natural resources to the forefront for planning and decision making. The County's Greenprint plan has identified 'Greenprint' areas (See Exhibit H—Existing Conditions Map) which are defined as existing natural connections in the landscape that facilitate movement of plants and animals between larger patches of habitat. Through this initiative, the County is focusing on wetlands, water quality, flood control, fish and wildlife habitat, education, recreation, mineral deposits, and habitat fragmentation.

The loss and fragmentation of habitat have been taken into consideration during the planning phases of the AUAR area. In an effort to promote connection and reduce fragmentation, large "habitat corridors" have been left intact to allow wildlife species to move through the AUAR area via natural areas with minimal human exposure. These larger habitat areas will help to reduce the 'edge effect' within specific cover types; in particular woodlands and forests. The term 'edge effect' is used to describe the encroachment of the community present at the perimeter of a given habitat type into the core of that habitat. Increased edge effect is generally the result of habitat fragmentation, which causes an increase in the perimeter, outside edge, in relation to the total area within the habitat type. An edge effect will be much more pronounced in habitats bordered by communities impacted by human activity.

The transition area at the edges, or between two or more habitat types, where communities come together is referred to as an ecotone. Ecotones tend to be high in plant and wildlife diversity, but are typically occupied by more generalist and highly adaptive species. Specialist species tend to out-compete these generalist species as you move out of the ecotones, and deeper into a particular habitat types. In addition, an edge effect is usually present to some degree at every ecotone.

A number of woodland wildlife species are considered specialists and prefer to inhabit deeper portions of the woodlands and forests. The deeper portions of the woodlands and forests in larger wooded tracts are less likely to be inhabited by the generalist wildlife species, which because of their highly competitive nature will out-compete more specialized wildlife species near the edges of the woodland.

Some wildlife species will experience little decline, and possibly an increase in abundance due to development. In general, a number of passerine bird species are well-adapted to change, and can thrive in urban settings. These species include the American robins, American crows, common pigeons, European starlings, common sparrow, and the common grackle. Local Canada geese populations may increase with the addition of short grass lawns, which are ideal for feeding. Mammal species such as plains pocket gophers and thirteen-lined ground squirrels may also benefit from an increase in short grass lawns.

Focusing road placement to the fringes of large established wetland complexes will assist in keeping reptile and amphibian habitat intact and reduce the impacts of the roads on their populations. Roads can impose significant barriers to the movement of reptiles and amphibians, and these barriers can result in a population decline if a significant number of animals are killed by automobiles.

b. Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources such as native prairie habitat, colonial waterbird nesting colonies or regionally rare plant communities on or near the site? ☐ Yes ☒ No

If yes, describe the resource and how it would be affected by the project. Indicate if a site survey of the resources has been conducted and describe the results. If the DNR Natural Heritage and Nongame Research program has been contacted give the correspondence reference number: ERDB #20060898. Describe measures to minimize or avoid adverse impacts.

A review was conducted by the Department of Natural Resource's Natural Heritage and Nongame Research Program (NHNRP) (Appendix B—MN DNR Correspondence). A search of the Minnesota Natural Heritage database determines if any rare plant or animal species or other significant natural features are known to occur within an approximate one-mile radius. Based on this review, there is one known occurrence of rare species and no known occurrences of natural communities within approximately one-mile of the AUAR area. According to the database search results, an Eastern Spotted Skunk (*Spilogale putorius*), a threatened species, was observed in Section 21 and 28, Mankato Township in 1968. However, according to the MN DNR and based on the nature and location of the proposed project, this project is not believed to affect any known occurrences of rare features. The NHNRP database is continually updated and is the most complete source of data on Minnesota's rare or otherwise significant species, natural communities, and other natural features. However, this database is not comprehensive and there may be significant natural features in this area that are not represented in this database. A county-by-county survey of rare natural features is currently underway, and has been completed for Blue Earth County, therefore information about natural communities is quite thorough for this county. However, because survey work for rare plants and animals is less exhaustive, and because there has not been an on-site survey of all areas of the county, ecologically significant features for which the DNR has no record may exist in the area.

## 12. Physical impacts on water resources.

Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface waters such as a lake, pond, wetland, stream or drainage ditch? ☒ Yes ☐ No

If yes, identify water resource affected and give the DNR Protected Waters Inventory number(s) if the water resources affected are on the PWI: 07-71W. Describe alternatives considered and proposed mitigation measures to minimize impacts.

**Physical impacts on water resources.** The information called for on the EAW form should be supplied for any of the infrastructure associated with the AUAR development scenarios, and for any development expected to physically impact any water resources. Where it is uncertain whether water resources will be impacted depending on the exact design of future development, the AUAR should cover the possible impacts through a "worst case scenario" or else prevent impacts through the provisions of the mitigation plan.



Possible hydrologic alterations include impoundment of surface water runoff associated with the creation of drainage areas to maintain pre-development runoff flow rates. The project will also most likely involve grading of drainage ditches within the AUAR area, outfall structures in connection to the large wetland area in the middle of the site and outfall structures to drainage ditches within the AUAR area, and it is anticipated there will be some wetland filling and replacement in association of specific development projects.

There is no other dredging, filling, stream diversions, or diking anticipated of any surface waters such as a lake, pond, stream, or drainage ditch. If an outfall structure is designed to be constructed below the ordinary high water elevation, a DNR Protected Waters permit approval will be required. Hydraulic and hydrologic modeling will be completed to help determine and maintain pre-development runoff rates and Best Management Practices will be used to minimize impacts.

#### **Transfer of County Ditch Systems from County to Municipality**

There are currently three Blue Earth County Ditch Systems in the AUAR area. These systems are County Ditch No. 46, County Ditch No. 12 and County Ditch No. 43.

County Ditch No. 46 is a tiled system which drains the area along CSAH 17/Madison Avenue. It is currently located within Mankato city limits to the east and west of TH 22. County Ditch No. 12 is a drainage ditch which drains a large portion of the AUAR area. It runs from the large wetland complex in Section 14 of Mankato Township south and then east and turns into Wilson Creek South of Hoffman Road east of TH 22. County Ditch 43 is a tiled system on the southeast corner of the AUAR area and drains south into the Le Sueur River.

As the areas adjacent to these drainage systems develop and are annexed into the City of Mankato, these systems are usually improved or modified to meet stormwater runoff regulations. To allow these drainage systems to be modified without going through the Improvement Process as outlined in 103E.215, these systems must be transferred to the Municipality per Minnesota Statute 103E.812. The improvement process is lengthy and involves the participation of all of the land owners within the ditch system which are located outside of the city limits.

As the land adjacent to the ditch system is developed, the portions of the County Ditch System adjacent to the developing property should be transferred to the City of Mankato. This is accomplished by a petition initiated by the City to the Blue Earth County Drainage Authority. This petition includes the following items as outlined in Minnesota Statute 103E.12 Subdivision 3:

##### **Subd. 3. Petition.**

- (a) The petition must designate the drainage system, or portion thereof, proposed to be transferred and show that the transfer is necessary for the orderly management of storm, surface, or flood waters, including management for water quality purposes.
- (b) The petition must indicate the impact, if any, that the transfer will have on properties utilizing the drainage system for an outlet or otherwise benefiting from the existence of the drainage system.
- (c) The petition must include an engineering report, prepared by the transferee water management authority, establishing, for the record, the nature and extent of the drainage easement occupied by the drainage system, and the as-constructed, or subsequently improved, depth, grade, and hydraulic capacity of the drainage system.

According to the statute listed above, the petition for transfer of control must be initiated by the City of Mankato, not the County or the Land Owner, since the City will be taking over control of the public drainage system. Exhibit P—Transfer Needs of the County Ditch

System shows the portions of the County Ditches near the AUAR area currently inside the city limits which will be transferred upon agreement between the County and City. The Exhibit also shows the ditch systems that should be transferred as development occurs adjacent to the ditch system and the watershed areas for each system.

### **Potential Wetland Evaluation**

All development in the AUAR area will be subject to City ordinance once annexation into the City of Mankato is complete. A detailed wetland investigation is required before development occurs on individual parcels within the AUAR area. Wetlands found on the site through the investigation will be handled in accordance to the 1991 Minnesota Wetland Conservation Act (WCA) and the Clean Water Act Section 404 administered by the Army Corps of Engineers. Mankato also has a wetland setback ordinance in place which requires all impervious surfaces to be setback 16.5-feet from a delineated wetland boundary.

A wetland evaluation of the AUAR area was completed by I&S Engineers & Architects, Inc. to give greater detail regarding possible wetland areas within the AUAR boundary. Historic aerial photographs, soil survey data, NWI maps, and field observation were utilized to evaluate potential wetland areas and to create a Potential Wetlands Area Map (Exhibit K—Potential Wetland Areas Map).

Historical aerial photograph review data was gathered and utilized in accordance with the State of Minnesota Interagency Cooperative Agreement for Implementation of the Federal Wetland Delineation Memorandum of Agreement (FWDMA) (1994). The established guidelines for the Minnesota Wetland Mapping Conventions (MWMC) for the 1985 Food Security Act (as amended) and the Section 404 Clean Water Act (CWA) portion of the FWDMA were specifically utilized for the aerial photograph review and interpretation.

The Blue Earth County Soil Survey was utilized in conjunction with the historic aerial photograph review data to reduce the potential for error by identifying crop stress that may not be hydrologically related. For example, water-related crop stress signatures can come from either an abundance of hydrology or from a lack of hydrology, such as on slopes and hills. The soil survey is utilized to help determine if areas showing signatures are based on a lack of hydrology. The soil survey was also used to establish potential wetland areas within non-crop settings that could not be accessed during field observations.

The National Wetland Inventory (NWI) was used to assist in the identification of potential wetland areas in non-crop settings (See Exhibit J—Hydrology Features Map). According to the MWMC, if a wetland basin identified within an agricultural field is also shown on the NWI, then the interpretation criteria regarding aerial photograph review changes. For example, if the NWI identifies a wetland basin in an agricultural field, then the percentage of normal years showing wetland signatures to identify an area as wetland is less than what is required for areas not indicated on the NWI.

Field identification was also conducted to determine additional potential wetland areas not present on the NWI. Only the obvious wetland basins were identified through the field identification process, however, areas were not investigated with the detail of a wetland delineation.

Areas currently in agricultural production may have previously been wetland area, except, due to drain tile installation and drainage ditch excavation, some of these wetlands may no longer meet the hydrology and/or hydric soil criteria as described by the Army Corps of Engineers 1987 Manual.

The wetland areas identified on the Potential Wetland Areas Map (Exhibit K) are not based on an official wetland delineation and the information presented is only intended to be utilized as a planning and informational tool. The potential wetlands marked

on this map do not constitute an official wetland delineation. Prior to any construction or development, an official wetland investigation must be completed by a wetland professional to determine the presence, type, and boundary of all wetland areas on the site in accordance with the criteria set forth in the Army Corps of Engineers 1987 Manual.

## **MITIGATION**

A detailed wetland investigation will be completed according to the criteria set forth in the Army Corps of Engineers 1987 Manual for all areas before construction or development occurs at a site. The results of the investigation will be submitted to the City of Mankato for review. Wetlands found on the site through the investigation will be handled in accordance to the 1991 Minnesota Wetland Conservation Act (WCA) and the Clean Water Act Section 404 administered by the Army Corps of Engineers. Best Management Practice (BMP) requirements mandate wetlands be protected from erosion and sedimentation throughout all phases of a project. Site runoff is required to be routed through treatment ponds and infiltration areas prior to any offsite, and potential wetland integration. Mankato Zoning Ordinance Section 10.82, Subd 11. Environmentally sensitive areas wetlands, outline wetland setbacks as: All structures and other impervious surfaces shall maintain a 16.5 foot setback from the boundary of a wetland. The setback area shall be maintained with naturally occurring vegetation. At this time, City ordinance does not require wetlands to be placed within city, county, or state-owned easements to legally protect them from property owner actions. However, the City does request all areas used for wetland replacement be dedicated to the City as an outlot once certification is complete. Generally, wetland mitigation areas are put into drainage or conservation easements around existing wetlands on a site. The City has required conservation easements for other natural resources areas in the past, such as stream courses and woodlands, and is currently examining the dedication of conservation easements for all wetland areas.

The MPCA rules governing wetlands (Minn. R. 7050.0186) require that impacts to wetlands be avoided when prudent and feasible alternatives exist. When impacts cannot be avoided, the MPCA, the MPCA rules require impacts to be minimized. Only when efforts to avoid and minimize impacts have been exhausted can compensatory mitigation be considered.

Due to the lack of current development in the area, it is expected that prudent and feasible alternatives exist, and that wetland impacts can be avoided. Some possible circumstances occurring under sequencing flexibility outlined under WCA Ch. 8420.0520 under which impacts to wetlands can genuinely be considered anything but avoidable may include the following:

- 1.) The wetland to be impacted has been degraded to the point where replacement of it would result in a certain gain in function and public value;
- 2.) preservation of a wetland would result in severe degradation of the wetland's ability to function and provide public values, for example, because of surrounding land uses and the wetlands ability to function and provide values cannot reasonably be maintained through other land use controls or mechanisms;
- 3.) the only feasible and prudent upland site available for wetland replacement or development has greater ecosystem function and public value than the wetland. Although this is a rare circumstance since there will usually be several options for siting the replacement wetland or development, it may be appropriate if the project sponsor:
  - a. Demonstrates impact minimization to the wetland;
  - b. agrees to perpetually preserve the designated upland site; and
  - c. completely replaces the impacted wetland's functions and public values; or
- 4.) the wetland is a site where human health and safety is a factor.

Any wetland impacts involved with construction or development within the AUAR area will be administered in accordance with the Minnesota Wetland Conservation Act and Section

404 of the Clean Water Act, which is regulated by the Army Corps of Engineers. All sequencing requirements must be satisfied prior to the City's approval of any wetland impacts or wetland replacement plans. Proper sequencing implies that all attempts to avoid wetland impacts, both direct and indirect, have been considered. If avoidance of impacts can not be accomplished, then the wetland impacts must be minimized by limiting activities within the wetland to the maximum feasible extent. All unavoidable wetland impacts must then be replaced by wetland restoration, wetland creation, or the purchasing of credits from a wetland bank account. Wetland replacement for impacts within the City of Mankato usually has a minimum ratio of 2:1 (New Wetland Credit + Public Value Credit: Impacted Wetland Area). Section 404 of the Clean Water Act authorizes the Army Corps of Engineers to issue permits for wetlands under their jurisdiction. The Army Corps of Engineers will usually require the same sequencing standards as listed above, however, the ACEOE typically requires a wetland replacement of 1.5:1 (Replacement wetland area – New Wetland Credit: Impacted wetland area).

It should also be noted that the MPCA does not consider wetlands that are constructed primarily to treat a developed area's stormwater to be eligible for mitigation credit. However, within the Wetland Conservation Act (WCA) stormwater treatment areas which discharge treated stormwater into a wetland or public waters are eligible for mitigation credit. The treatment areas must meet the following criteria; the local government unit (LGU) has an approved and active stormwater management plan, the treatment areas are constructed in non-wetland sites, the treatment areas are associated with an ongoing or proposed project that will impact a wetland or public water, and the treatment areas are established with native non-invasive vegetative cover.

Isolated stormwater treatment ponds and wet detention basins are eligible for Public Value Credit (PVC) up to the normal pool area. Stormwater infiltration areas, up to the one year design pool, are eligible for PVC. If a two celled wet detention system is utilized the normal pool area of the upper cell is eligible for PVC; provided the upper and lower cells are separated completely by a barrier up to the ten year critical event.

The St. Paul District of the U.S. Army Corps of Engineers (USACOE) is currently working on completing their Compensatory Mitigation Policy, which does address isolated stormwater treatment areas and downstream cells of multiple cell treatment areas. In the draft policy the USACOE does not give mitigation credit for isolated stormwater treatment areas. The second and thirds cells (downstream) of multiple cell treatment areas are currently being considered for partial mitigation credit; provided that the acreage of the treatment area exceeds the size necessary to meet local and/or state requirements for water quality and stormwater retention for the project site. Other conditions with regard to water depth, basin shape and contour, and water level bounce are being proposed to promote the increased simulation of wetland function within these treatment areas.

### 13. Water use.

Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? ☒ Yes ☐ No  
If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

**Water Use.** *If the area requires new water supply wells specific information about that appropriation and its potential impacts on groundwater levels should be given; if groundwater levels would be affected, any impacts resulting on other resources should be addressed.*

#### **Water Wells**

Full development of the AUAR area will require the abandonment of several water wells. Exhibit O—Water Supply System Plan shows the approximate location of these wells as

indicated in the Minnesota Department of Health (MDH) and the Minnesota Geological Survey's (MGS) County Well Index (CWI). There may also be other private wells located within the AUAR boundary which are not registered in the CWI. All existing wells located on the site or identified (including any unregistered wells encountered during construction), are required to be sealed and abandoned in compliance with MDH regulations prior to site development.

Blue Earth County supplied additional information regarding existing and potential abandoned wells in the project area. The location of these wells, along with the Unique well number and the H-Series numbers (if applicable) can also be found in Exhibit O—Water Systems Plan Map. Abandoned and unregistered wells are under MDH jurisdiction and administered by Blue Earth County. Blue Earth County has detailed procedures that can be utilized to determine the likelihood of an abandoned well being located on specific parcels. As assessment is generally made to identify any old building sites on a specific parcel which are no longer present in order to provide locations which will likely require an abandoned well search prior to development. Specific information about the age of all existing structures may be obtained from [www.blueearth.minnesotaassessors.com](http://www.blueearth.minnesotaassessors.com) or by contacting Blue Earth County Environmental Services or Taxpayer Services.

According to the Minnesota Department of Health's MDH-Mankato Community and Noncommunity drinking water staff, (See Appendix D—MDH Correspondence) There is one 'transient noncommunity' public water supplier within the boundaries of the AUAR area. This supplier is the radio station KTOE, which is located in the extreme SE corner of Section 11, T108N, R26W (along CSAH 41). On the opposite corner from KTOE is the natural gas pumping station, which is also a transient public water supplier but is outside the AUAR area boundary. There are no community or nontransient-noncommunity public water supply systems in the AUAR area.

The 'wellhead protection area' for transient public water suppliers consists of a 200 foot radius around the well. Within this radius, setbacks to potential contaminant sources (sewage pipes, tanks, septic systems, etc.) must be met according to the state well code.

Additional individual water wells will not be installed within the AUAR area if city services are available.

### **Public Water Supply**

Development within the AUAR area will utilize the City of Mankato's public water supply. The City's water system includes municipal wells, storage tanks/towers, treatment facilities and distribution system. Mankato's Department of Natural Resources Water Appropriation Permit number is 70-1412.

The City appropriates water from a combination of sources including 6 wells. Four of the wells are deep wells, cased and open rock hole type, ranging in depth from 630 to 752 feet deep. These wells, #11, 12, 14, and 16, are constructed into the Mt. Simon Hinckley Aquifer. Wells #11 and 12 cannot be pumped to the Water Plant for treatment and are used for emergency standby. A seventh well, well #5, has been abandoned for public water supply, and is used only as a monitoring well by the Minnesota Department of Natural Resources.

Two of the production wells, wells #13 and 15, are Ranney vertical caissons with horizontal collector laterals. Both of these wells are approximately 60 feet deep, and are fitted with multiple pumps. Ranney type wells are considered a groundwater source, though they will influence both the surface and groundwater in the area. Each well has several laterals or screens extending out horizontally in different directions near the bottom of the vertical caisson. The water filters through the lateral screens to the vertical caisson and is pumped to the Water Plant. Well #15 was recently constructed and developed. The well house for

well #15 will be completed in 2007. Once completed, the two Ranney Wells have the capacity to pump 7.49 million gallons of water per day.

With the completion of well #15, the four production wells have a combined capacity of approximately 10.6 million gallons per day (mgd) with 2.5 mgd of elevated storage capacity and an average daily usage of 5.1 million gallons. The two emergency standby wells, wells # 11 and 12 have additional production capacity of 2.1 mgd. Individual information for these wells can be presented in Table 13-1:

**Table 13-1. Public Water Supply Wells**

| Well No. <sup>1</sup> | Unique No. | Diameter | Depth   | Capacity | Status               |
|-----------------------|------------|----------|---------|----------|----------------------|
| 5                     | 209826     | 24 in.   | 715 ft. | 0        | Abandoned (Monitor)  |
| 11                    | 209395     | 24 in.   | 848 ft. | 650      | Emergency (stand-by) |
| 12                    | 209391     | 30 in.   | 852 ft. | 850      | Emergency (stand-by) |
| 13 <sup>2</sup>       | 209830     | 16 ft.   | 57 ft.  | *        | Production           |
| 14                    | 458567     | 18 in.   | 630 ft. | 800      | Production           |
| 15 <sup>3</sup>       | 683899     | 13 ft.   | 58 ft.  | *        | Production           |
| 16                    | 686257     | 30 in.   | 676 ft. | 1,400    | Production           |

<sup>1</sup>Wells 13 and 15 are Ranney vertical caissons with horizontal collector laterals.

<sup>2</sup>Well #13 (2,850) Ranney Well Pump Info – Pump #1:1,900 gpm, Pump #2:1,450 gpm, Pump #3:1,400 gpm;

<sup>3</sup>Well #15 (2,350 gpm) Ranney Well Pump Info – Pump #1: 2,000 gpm, Pump #2: 2,000 gpm

Source: MN DNR Water Appropriations Permit Program information, 2004

According to the MN DNR Water Use—Water Appropriation Permit Program, the City is authorized to appropriate 2,000 million gallons per year (MGY) under their current permit. In 2006, the City of Mankato reported pumping 1,944.84 (finished water, raw figure was not available for draft) MGY of water. The City has submitted an application to increase their allowable appropriation to 2,800 MGY for the years 2007 – 2011.

The approximate anticipated water use for full build-out within the AUAR area is based upon estimated usage per acre for the various land uses anticipated. Peak water usage is expected to mirror peak sanitary sewer flows, while average water use is estimated at approximately one fourth of the peak usage. Usage per acre for the various land uses is based on estimates used in the City's current Sanitary Sewer Master Plan by Zenk Read Trygstad & Associated, Inc. Table 13-2 presents the peak usage assumptions for the various land uses within the AUAR area, and Table 13-3 tabulates the mix of land uses within each of the sub-districts.

**Table 13-2. Unit Use per Acre by Land Use (Peak Use)**

| Land Use                    | Estimated Flow per Acre (gpd) |
|-----------------------------|-------------------------------|
| Single Family Residential   | 2,000                         |
| Multi Family Residential    | 5,000                         |
| Mixed Residential           | 16,000                        |
| Retail                      | 2,000                         |
| General Commercial          | 2,000                         |
| Highway Commercial          | 2,000                         |
| Neighborhood Commercial     | 2,000                         |
| Lifestyle Center Commercial | 2,000                         |
| Mixed Office Commercial     | 2,000                         |
| Office/Tech/Flex Space      | 1,500                         |
| Industrial/Commercial       | 5,000                         |
| Office Industrial Campus    | 5,000                         |
| Civic/School/Institutional  | 5,000                         |
| Park/Open Space             | 250                           |

**Table 13-3. Land Use Mix by Sub-District**

| Land Use<br>Acres           | Sub-District |    |    |    |     |     |     |     |     |     |    |      |      |      |      |      |
|-----------------------------|--------------|----|----|----|-----|-----|-----|-----|-----|-----|----|------|------|------|------|------|
|                             | A            | B  | C  | D  | E   | F   | G   | H   | I   | J   | K  | L    | M    | N    | O    | P    |
|                             | A1           | M1 | M2 | B1 | ME1 | ME2 | ME3 | H1  | H2  | H3  | H4 | 83-1 | 83-2 | 83-3 | 83-4 | 83-5 |
| Single Family Residential   |              |    |    |    | 33  | 11  | 23  | 49  |     | 23  | 16 | 133  | 34   | 31   | 79   | 179  |
| Multi Family Residential    |              |    |    |    |     | 4   |     | 61  | 64  |     | 43 |      | 32   | 1    | 34   | 28   |
| Mixed Residential           |              |    |    |    |     |     |     | 11  | 5   |     |    |      | 13   |      |      |      |
| Retail                      |              |    |    |    |     |     |     | 11  | 5   |     |    |      | 13   |      |      |      |
| General Commercial          |              |    |    |    |     |     |     |     |     |     |    |      |      |      |      |      |
| Highway Commercial          |              | 5  | 46 |    |     |     |     |     |     |     |    |      |      |      |      |      |
| Neighborhood Commercial     |              |    |    |    |     |     |     |     |     |     |    |      | 12   |      |      | 8    |
| Lifestyle Center Commercial |              |    |    |    |     |     |     |     |     | 18  |    |      |      |      |      |      |
| Mixed Office Commercial     | 40           |    |    |    |     |     |     | 8   |     |     |    |      |      |      |      |      |
| Office/Tech/Flex Space      |              |    |    |    |     |     |     | 37  |     |     |    |      |      |      |      |      |
| Industrial/Commercial       | 121          | 87 | 52 |    | 26  |     |     |     |     |     |    |      |      |      |      |      |
| Office Industrial Campus    |              |    |    | 31 | 48  |     |     |     |     | 75  | 14 |      |      |      |      |      |
| Civic/School/Institutional  |              |    |    | 19 |     |     |     |     | 17  |     |    |      | 2    | 33   |      |      |
| Park/Open Space             |              |    |    |    | 22  | 20  | 74  | 43  | 12  |     | 1  |      | 53   | 59   | 73   |      |
| Total Acres                 | 161          | 92 | 98 | 50 | 129 | 34  | 97  | 220 | 103 | 116 | 74 | 133  | 159  | 124  | 186  | 215  |

The anticipated water use for the AUAR area at full development is presented by sub-district in the Table 13-4. Use is in millions of gallons per year (MGY).

**Table 13-4 Water Use Sub-District**

| Sub-District | Average Use<br>(MGY) | Sub-District | Average Use<br>(MGY) |
|--------------|----------------------|--------------|----------------------|
| A1           | 62.55                | H3           | 41.69                |
| M1           | 40.59                | H4           | 28.98                |
| M2           | 32.11                | 83-1         | 24.32                |
| B1           | 22.84                | 83-2         | 46.87                |
| ME1          | 40.22                | 83-3         | 22.43                |
| ME2          | 5.81                 | 83-4         | 31.58                |
| ME3          | 4.15                 | 83-5         | 46.93                |
| H1           | 62.11                | <b>Total</b> | <b>558.86</b>        |
| H2           | 45.69                |              |                      |

The approximate anticipated water use for full build-out of the AUAR area, assuming land use scenario C, is approximately 558.86 MGY. Additionally, the peak daily demand will increase an estimated 2.30 million gallons as a result of fully constructing this project. While the City has sufficient supply capacity to support the project for the foreseeable future, demand from development within other areas of the City may require additional supply sources be brought on line prior to full development of the AUAR area. It is also likely the City will continue to amend their DNR permit periodically (permit revisions occur on a five year cycle based on anticipated needs) to provide for anticipated growth of the Mankato area in addition to the project before the AUAR area is fully developed.

The City of Mankato Water System Master Plan Report (WSMP) by Black & Veatch (1992), made a number of recommendations regarding future expansion of the City's water system, including future trunk watermain, storage facilities, and treatment works. One recommended improvement was the construction of trunk watermain to serve the AUAR area, with the potential to provide service to the City of Eagle Lake in the future. The watermain configuration recommended in the WSMP is shown in Exhibit O—Water Supply System Plan.

While some of the recommendations for improvements made in the WSMP have been followed, some have not. In addition, land use assumptions made under the WSMP differ from those in the current project. In the analysis to provide water service to the AUAR area, a trunk system was proposed that would provide service to the AUAR area under the

current land use assumptions (land use option C), preserve the option of providing water to the City of Eagle Lake, and provide the looping for the system north and south of Highway 4 as recommended. The proposed trunk watermain system for the AUAR area is shown in Exhibit O—Water Supply System Plan.

As stated above, land use assumptions made for the AUAR area in the 1992 WSMP change with the current project, and the current water system varies somewhat from what was proposed in the WSMP. As a check on the capacity of the current, in-place system to provide service to the AUAR area, the trunk system proposed for the AUAR area was modeled with WaterCAD hydraulic modeling software by Haested Methods. Some key results from the modeling (demand, available flow, residual pressure) for a number of locations within the AUAR area is also shown in Exhibit O—Water Supply System Plan. The modeling results indicate the City's existing watermains will not need to be enlarged to provide an acceptable level of service to the AUAR area.

As shown in Exhibit O—Water Supply System Plan, trunk watermains will connect with existing water supply systems at Madison Avenue, Hoffman Road, and TH 83. In addition, a 12-inch trunk is shown extending north of US Hwy 14 along the proposed CSAH 12 alignment to complete the loop linking the system north and south of US Hwy 14. Stubs are provided on Madison Avenue, TH 83, and 594<sup>th</sup> Avenue to provide future service to areas south and east of the AUAR area.

#### **Dewatering**

There will not be any anticipated appropriation of any ground or surface water (including dewatering) for development within the AUAR area. However, one or more temporary dewatering systems may be necessary to conduct construction activities including the installation of roads, sanitary sewer, municipal water, and stormwater facilities in some areas. Contractors will carry out these activities on a case-by-case basis at the minimum duration and quantity necessary to construct utility services for the affected sites. The quantity and duration of construction dewatering is not known at this time, but it is expected that any dewatering at the site will be temporary. If dewatering is found to be necessary, and if dewatering exceeds 10,000 gallons per day or 1 million gallons in a year, then a DNR Water Appropriation Permit application will be submitted.

If it becomes apparent that dewatering on the site from construction purposes will not exceed 50 million gallons in total and for the duration of one year from the start of pumping, the contractor or project proposer for specific development projects will apply to the DNR for coverage under DNR General permit 97-0005 for Temporary Water Appropriation. If appropriation is needed, any groundwater from construction dewatering purposes will be discharged to temporarily or permanent stormwater ponds located within the AUAR boundary. Dewatering activities, if required, are not expected to affect existing wetland areas.

Construction activities requiring dewatering are not anticipated to be extensive enough and/or continue for an extended period of time in order to impact domestic or municipal wells.

#### **14. Water-related land use management district.**

Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? ☐ Yes ☒ No

If yes, identify the district and discuss project compatibility with district land use restrictions.

**Water-related Land Use Management Districts.** Such districts should be delineated on appropriate maps and the land use restrictions applicable in those districts should be described. If any variances or deviations from these restrictions within the AUAR area are envisioned, this should be discussed.



No state or federally-designated wild or scenic river districts occur within or adjacent to the AUAR area, nor does the site involve a shoreland zoning district. According to the Federal Emergency Management Administration (FEMA) map (FIRM panel #275231 0045 D dated 3/5/90, the site is within 'Zone X' which is described as, "areas determined to be outside a 500-year floodplain," therefore, the project does not involve a delineated 100-year flood plain.

#### 15. Water surface use.

Will the project change the number or type of watercraft on any water body? ☐ Yes ☒ No

If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

**Water surface use.** *This item need only be addressed if the AUAR area would include or adjoin recreational water bodies.*

The AUAR area is not adjacent to nor does it contain bodies of water to support significant motorized watercraft usage.

#### 16. Erosion and sedimentation.

Give the acreage to be graded or excavated and the cubic yards of soil to be moved:

acres n/a; cubic yards n/a. Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

**Erosion and sedimentation.** *The number of acres to be graded and number of cubic yards of soil to be moved need not be given; instead, a general discussion of the likely earthmoving needs for development of the area should be given, with an emphasis on unusual or problem areas. In discussing mitigation measures, both the standard requirements of the local ordinances and any special measures that would be added for AUAR purposes should be included.*

##### Steep Slopes

The general site topography of the AUAR area is generally flat with slopes ranging from less than 1% up to 2-6% with the average slope on the majority of the site less than 1% (See Exhibit B—USGS Topography Map). There are no steep slopes present within or adjacent to the AUAR area.

##### Highly Erodible Soils

According to the United States Department of Agriculture (USDA), which includes the Farm Service Agency (FSA) and the Natural Resources Conservation Services (NRCS), there are no portions of the AUAR area classified as Highly Erodible Land (HEL). The USDA categorizes most soils within the AUAR area as NHEL, meaning, Not Highly Erodible Land. There is a small portion of PHEL (Potentially Highly Erodible Land) along the south boundary near TH 83.

##### Erosion & Sedimentation

The City of Mankato has officially addressed erosion and sediment control for new development in the following sources:

- City of Mankato Zoning Ordinance, Section 12.02 Erosion and Sediment Control
- The Mankato Drainage Plan (Barr, 1994) states:
  - "The following guidelines apply to the developing areas:
    1. The use of Best Management Practices (BMPs) to the greatest extent possible during all phases of development, including planning, design, construction, and maintenance.

BMPs are listed in the Minnesota Pollution Control Agency's "Protecting

Water Quality in Urban Areas” and include site planning, detention basin design, oil/grit separators, skimmers, filter strips, housekeeping practices, street sweeping, temporary sediment basins, silt fencing, flotation silt curtains, temporary diversions, riprap, seeding, etc.”

Wetlands are also required to be protected from erosion and sedimentation throughout all phases of a project. Site runoff within the AUAR area will be routed through treatment facilities and infiltration areas prior to any offsite, and potential wetland, integration. A developer is required to maintain pre-development runoff flow rates so that the peak discharge rates from the 2-year and the 100-year frequency, and the critical duration storms are no greater than pre-development basin watershed conditions for a project while utilizing the Minnesota Pollution Control Agency (MPCA) Best Management Practices (BMPs) to minimize impacts.

A developer of any parcel within the City of Mankato will be required to obtain and comply with National Pollutant Discharge Elimination System (NPDES) permit requirements, including a Stormwater Pollution Prevention Plan (SWPPP). A SWPPP will be developed to meet the NPDES requirements and City regulations and will include:

- Management of stormwater discharge during construction
- Use of Best Management Practices (BMPs) to control erosion
- Inspection of all erosion controls at least once every seven days during active construction and within 24 hours after a rainfall event greater than 0.5 inches in 24 hours

Effective erosion and sediment control using MPCA Best Management Practices (BMPs) is required for all land disturbances to control water runoff and sediment erosion on adjacent properties, streets, storm drains, pond areas, or other water courses (see [MPCA website](#) for additional information). The erosion and sediment control measures will be used during and after construction and must be inspected and repaired regularly. BMPs for construction activity on the site will include items such as silt fence, straw bales, filter fabric, seeding, and rip rap. A sample of the requirements is also summarized below.

- Property and streets adjacent to the site of a land disturbance shall be protected from sediment deposition. This shall be accomplished by preserving a well-vegetated buffer strip around the lower perimeter of the land disturbance, by installing perimeter controls such as sediment barriers, filters, dikes or sediment basins, by stockpiling soil in appropriate locations or by a combination of such measures.
- All storm sewer inlets which are functioning during construction shall be protected so that sediment-laden water will not enter the conveyance system without first being filtered or otherwise treated to remove sediment.
- Property and waterways downstream from development sites shall be protected from flooding and erosion due to increases in the volume, velocity and peak water flow rate of stormwater runoff. Concentrated stormwater runoff leaving a development's site shall be discharged directly into a well-defined natural or man-made off-site receiving channel or pipe.
- A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized forthwith after land disturbing activity is complete.
- Whenever construction vehicles access public roads, provision shall be made to minimize the transport of sediment by runoff or vehicle tracking onto the paved surface. Where sediment is transported onto a public road surface, the roads shall be cleaned thoroughly at the end of each day.
- All temporary and permanent erosion and sediment control practices shall be maintained and repaired to assure the continued performance of their intended function.

- All temporary erosion and sediment control measures shall be removed within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed.

All construction and development within the AUAR area is required to provide specific performance standards to prevent or reduce, to the most practical extent, erosion and sedimentation and their associated effects within the City and to provide protection of adjacent properties and the preservation of soil and water resources. It is anticipated that potential adverse erosion and sedimentation impacts will be limited primarily to short-term effects, and not expected to affect water quality in adjacent wetlands and watercourses over the long term.

## 17. Water quality: surface water runoff

a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

**Water Quality-stormwater runoff.** For an AUAR the following additional guidance should be followed in addition to that in "EAW Guidelines":

- it is expected that an AUAR will have a detailed analysis of stormwater issues;
- a map of the proposed stormwater management system and of the water bodies that will receive stormwater should be provided;
- the description of the stormwater systems would identify on-site and "regional" detention ponding and also indicate whether the various ponds will be new water bodies or converted existing ponds or wetlands. Where on-site ponds will be used but have not yet been designed, the discussion should indicate the design standards that will be followed.
- if present in or adjoining the AUAR area, the following types of water bodies must be given special analyses:
- lakes: within the Twin Cities metro area a nutrient budget analysis must be prepared for any "priority lake" identified by the Metropolitan Council. Outside of the metro area, lakes needing a nutrient budget analysis must be determined by consultation with the MPCA and DNR staffs;
- trout streams: if stormwater discharges will enter or affect a trout stream an evaluation of the impacts on the chemical composition and temperature regime of the stream and the consequent impacts on the trout population (and other species of concern) must be included;

The project's proposed stormwater management system is conceptual in nature and is used as a basis for reviewers to identify and evaluate areas of potential impacts. As part of the preliminary plat process and prior to any consideration of construction or development with the AUAR area by the City of Mankato, all final engineered designs are required to demonstrate project compliance with all applicable Local/State/Federal regulations. In addition to the National Pollution Discharge Elimination System (NPDES) permit, the Storm Water Pollution Prevention Plan (SWPPP), and the Mankato City Zoning Ordinance, the City recently submitted their own Storm Water Pollution Prevention Program to the MPCA and will be in place for the protection, preservation, maintenance and use of the water and soil resources in this area.

According to the 1996 National Water Quality Inventory by the MPCA, stormwater runoff is a leading source of water pollution. In general, stormwater runoff can harm surface waters such as rivers, lakes, and streams which in turn, cause or contribute to water quality standards being exceeded. The most common urban stormwater impacts to natural hydrology include:

- 1) The watershed's natural response to precipitation events is altered,
- 2) Runoff velocity is increased,
- 3) Total runoff volume is increased,
- 4) Peak discharge rates are increased, and
- 5) Groundwater infiltration is decreased.

The Minnesota Pollution Control Agency (MPCA) is designated to be in charge of reducing the pollution and damage caused by stormwater runoff. This designation was mandated by Congress under the Clean Water Act. In 1990, the EPA promulgated rules establishing Phase I of the NPDES stormwater program. This program included regulation for MS4s to

implement a Storm Water Pollution Prevention Program to control polluted discharges. The Phase II rule extends coverage of this program to smaller municipalities and businesses which includes the City of Mankato. The primary goal of the stormwater pollution prevention program is to maintain water quality standards where there is compliance, and help bring waters that do not meet water quality standards into compliance through management and treatment of urban stormwater runoff. Minnesota regulates the disposal of stormwater through a combined NPDES/SDS permit and through the Municipal Separate Storm Sewer Systems (MS4s) program for applicable projects. The City of Mankato has been very proactive in their approach to stormwater master planning, and recently submitted their program to the MPCA as required by the NPDES program for MS4s. As the City's Storm Water Pollution Prevention Program develops, the City's Drainage Plan, as well as multiple ordinances, will have to be revised to incorporate the following 6 minimum control measures as mandated in the MS4 standards:

- 1) Public Outreach/education
- 2) Public involvement/participation
- 3) Illicit discharge detection/elimination
- 4) Construction site runoff control
- 5) Post construction stormwater management
- 6) Good housekeeping for municipal operations

The local stormwater program must establish measurable goals, best management practices to meet these goals, and a way to track performance and progress. These new rules will apply to the AUAR area and will need to be addressed during the design phase of construction. The BMPs will need to include measures to prevent or reduce the pollution of the waters of the State, including schedules of activities, prohibition of practices, maintenance procedures, and other management tools. For more information of BMPs, see question 16.

### **Existing Conditions**

The majority of the soils in the AUAR area are in the hydrologic condition classified as Type C/D with smaller areas classified as A/D, B, B/D, C, and D (See Exhibit I—Soil Classifications & Features Map). According to the Blue Earth County Soil Survey (1978), the hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and received precipitation from long-duration storms. The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a permanent high water table, soils that have a clay loam or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The City of Mankato requires that the post-development runoff rates do not exceed pre-development conditions. Regional and site specific stormwater facilities will be constructed

to treat quantity and quality of runoff from the AUAR area.

#### **Pre-Development Site Runoff**

The AUAR area is located within the Minnesota River-Mankato and Le Sueur River major watersheds. This section of the Minnesota River is currently listed as an impaired water with respect to turbidity (TSS), fecal coliform, mercury, and PCB's. The city of Mankato expects that a Total Maximum Daily Load (TMDL) will be developed for these impairments. The Minnesota River is also impaired with low dissolved oxygen during low flows. This TMDL has already been approved and the City is required to reduce phosphorus by 30% based on the year 2000 levels by 2025. The MS4 is required to address this in its Storm Water Pollution Prevention Program (submitted February 15, 2007).

Currently, most of the AUAR area is farmed with areas of the site containing woodland and wetland complexes. The existing runoff from the site likely contains fertilizer, pesticide, and herbicide residue due to the agricultural land use on the majority of the property. According to information obtained from the MN DNR, the AUAR area is within four watershed areas including: #6349 – Le Sueur River, #6275 – Minn River – Mankato, #6315 – Le Sueur River, and #6280 – Le Sueur River (See Exhibit J—Hydrology Features Map). The majority of the site is drained via field tiles and directed into County Ditch 12 which flows from the large wetland area in the middle of the AUAR area south and then west towards TH 22 and beyond.

According to the 1997 drainage plan prepared for the City of Mankato by Barr Engineering, with modifications added including additional storage areas, the site is located in parts of the North Industrial System Southeast, the Wilson Creek System Northwest, Southeast, and Northeast, and the Upper Thompson Ravine System (See Exhibit N-1—Stormwater Service Districts & Conceptual Treatment Areas). These areas are included in the drainage plan and several stormwater facilities are recommended for construction as the land in the area becomes developed. The City's drainage plan indicates a regional treatment pond in the northern section of the AUAR area just north of Madison Avenue, and also along the south boundary of the AUAR area along TH 83. The City's current zoning ordinance, Sect. VI: Zoning Districts and District Provisions, requires no more than 40% of the lot be covered by structures. This requirement may help keep a large portion of the development pervious. This would allow infiltration of water to keep runoff as low as possible. Hydrologic data regarding the existing site drainage will be modeled through a computer modeling system such as HydroCAD by Applied Microsystems.

#### **Post-Development Site Runoff**

Post-development site runoff will be typical of urban and mixed-use developments. There will most likely be an increase in phosphates and other substances typically associated with urban runoff. The quantity of runoff will most likely increase because of the addition of impervious surface area such as the construction of pavement, buildings and parking lot area. The existing wetlands on the site may be a concern with an increase in the amount of urban runoff. In general, urban runoff impacts to wetlands include: 1) increases in wetland bounce, 2) decrease in wetland plant and animal species diversity, 3) long-term alterations or destruction of wetland type and function, 4) increased peak discharge rates, and 5) reduction in groundwater infiltration.

Through the construction of a storm sewer system, and stormwater treatment facilities, the majority of the stormwater runoff from the development will be treated. This treatment will remove sediment and pollutants from the stormwater and enhance the quality of runoff leaving the site. The proposed stormwater system will be designed to accommodate and safely manage off-site flows as well as the flow generated on-site. The current City of Mankato guidelines dictate that the stormwater conveyance system shall be designed for the 10-year runoff rates with overland emergency overflow routes for storm events that exceed this return period. The stormwater treatment facilities will lower peak flows from the site to below pre-development flow rates for 2, 10, and 100-year rainfall events. During and

after construction, stormwater will be routed through these facilities to prevent off-site sedimentation and wetland impacts. As stated earlier, the City of Mankato is in the process of developing a Storm Water Pollution Prevention Program that will include the mandated six minimum control measures for MS4s as well as measures to meet the Lower Minnesota River Low Flow Dissolved Oxygen TMDL. The requirements of this program will need to be followed for development within the project area.

As discussed earlier, stormwater management facilities will be constructed throughout the study area to mitigate the impacts on receiving waters from the development of the study area. These facilities will be designed and constructed on both a regional and site specific basis. The entire study area is within the Minnesota River watershed. This section of the Minnesota River is currently listed as an impaired water with respect to turbidity, fecal coliform, mercury, and PCB's. The Minnesota River is also impaired with low dissolved oxygen during low flows. The conversion of predominantly agricultural land to an urban land use will typically decrease fecal coliforms, and may or may not affect the other four impairments. To ensure that stormwater impacts, particularly for those impairments, are mitigated, it is proposed that these facilities include a variety of stormwater management methods. These methods will consist of the following:

- Traditional stormwater detention ponds
- Constructed wetlands
- Vegetative and media filtration

The study area has been analyzed to determine the approximate volume of storage and land area that would be needed to provide stormwater treatment and rate control based on the existing and proposed land uses. Exhibit N-2—Alternative Stormwater Treatment Concepts defines the sub-watersheds and provides a tabulation of these estimated volumes and areas. In addition, Exhibit N-1—Stormwater Service Districts & Conceptual Treatment Areas provides proposed locations for regional stormwater facilities. The proposed facilities are discussed in detail in the following paragraphs, but generally the traditional stormwater ponds were located based on topography, future street geometry, and current property boundaries. It is assumed stormwater facilities will be constructed as the AUAR area is developed, and this report will serve as a guide for that development.

#### Traditional Stormwater Detention Ponds

Due to the prevalence of relatively impermeable clay soils and high water table as discussed previously, traditional stormwater detention ponds will play a vital role in both stormwater treatment and rate control. The ponds will be designed to comply with City of Mankato standards and the design guidelines as outlined in the 2005 Minnesota Stormwater Manual. Typical design considerations will include sideslopes that meet site safety and maintenance requirements, outlets that provide skimming as required by the NPDES requirements, and rate control to reduce peak flows to the 2, 10, and 100 year design storms. Based on known erosion concerns in the downstream channel, preliminary sizing has been performed to reduce discharge rates (and therefore velocity) to below the existing rates.

Several portions of the AUAR area have very flat terrain, and will be a challenge to design stormwater facilities. To adequately provide drainage for these areas as well as reduce costs, it is proposed that long, linear ponds be constructed. This can be noted in Exhibit N-2—Alternative Stormwater Treatment Concepts in the northwest portion of the study area.

#### Constructed Wetlands

Constructed wetlands are a variation on the traditional stormwater detention pond. These facilities typically take up a slightly large land area, but have been shown to provide an increase in water quality due to the variety of vegetation established in the facility. A constructed wetland requires pretreatment prior to discharge, so it is proposed that a small forebay be provided for sedimentation and ease of maintenance. There are several areas within the study area where this treatment method may be very practical. Along the existing

CSAH 17 near CSAH 86 there is a large area of land that is proposed to remain open space due to landowner wishes and a relatively high quality of natural features. A constructed wetland could be placed within this area, therefore providing stormwater treatment and rate control, while still maintaining the natural appearance of the area.

#### Vegetative and Media Filtration

Filtration consists of conveying stormwater through a media, in this case either vegetation or a constructed media. Filtration has been shown to significantly reduce Total Suspended Solids (TSS) which directly contribute to the turbidity of the receiving water. Filtration also, by its nature, increases the time of concentration in a stormwater system which results in a lower peak discharge and a reduction in the size of a downstream detention basin. It is proposed that filtration, particularly vegetative filtration, be considered in several key areas.

The Hoffman Road right-of-way is proposed to be 120-feet wide, which provides an opportunity to provide filtration and peak rate reduction for a large portion of the right-of-way by providing a vegetated filter in a median. Referring to Exhibit N-2—Alternative Stormwater Treatment Concepts, the proposed cross section will include two lanes of traffic in each direction with a median between them. This median will be depressed to allow for a vegetated swale to be constructed. Stormwater from the street and right-of-way will enter the swale through a storm sewer system and be routed through a series of small, permeable check dams prior to being discharge to a final treatment facility. This will not only increase the stormwater treatment, but will also reduce the cost of the storm sewer system for the road. It is proposed that County State Aid Highway (CSAH) 12 be designed in a similar fashion. Exhibit N-2—Alternative Stormwater Treatment Concepts provides a typical cross section for this major road. Note that in each of these sections curb and gutter is provided on the inside curb adjacent to the swale. This could be eliminated and replaced with a ribbon curb to allow for sheet flow into the swale, greatly reducing storm sewer costs. However, all final configurations will be determined in conjunction with the county engineer.

In addition to vegetated swales, media filtration with amended soils is another alternative method of treatment. This system consists of an amended soil (loam and sand) placed in a trench at the bottom of a swale. A subdrain is placed below the amended soil and outletted for final treatment. It is proposed that this option be used in areas that are not subject to heavy sand applications (such as sand application for icy road conditions), as the media filtration can quickly become clogged. Therefore, this would be an ideal application to apply to pond outlet channels or on a smaller scale on individual lots.

- b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

The AUAR area is located in five local watershed districts (according to the 1997 drainage plan prepared for the City by Barr Engineering), including: the North Industrial System Southeast, the Wilson Creek System Northwest, Southeast, and Northeast, and the Upper Thompson Ravine System (See Exhibit N-1—Stormwater Service Districts & Conceptual Treatment Areas). These local watersheds are included within: #6349 – Le Sueur River, #6275 – Minn River – Mankato, #6315 – Le Sueur River, and #6280 – Le Sueur River.

The majority of runoff from the project area will follow County Ditch No. 12 to Wilson Creek, which enters the Le Sueur River, then downstream to the Blue Earth River, and eventually to the Minnesota River and finally the Mississippi River and the Gulf of Mexico.

Stormwater within the AUAR area will be routed into stormwater facilities to provide rate control and water quality treatment before discharging to local waterbodies. The stormwater system will be designed to meet all NPDES guidelines and standards for removal of suspended sediment, phosphorus, and other nutrients from stormwater runoff. Stormwater facilities will be designed to reduce the amount of nutrient loadings entering the

Minnesota River.

Efforts will meet or exceed the City's ordinance to control erosion and prevent sedimentation. Mitigation measures are vital to avoid compounding to the downstream nuisance. See question 16 for a description of BMP mitigation measures. BMPs implemented during and after construction will be inspected and repaired regularly. As stated earlier, developers of individual parcels must obtain and comply with NPDES permit requirements, including the preparation of a SWPPP. The MPCA has set guidelines for the SWPPP. Below is a brief list of some of the items a developer of individual parcels must provide and comply with in the SWPPP to prevent sedimentation to downstream sources:

- Address the potential for sediment and pollutant discharges from the site
- Identify chain of responsibility for general contractor and owner Identify temporary sediment basins, if more than 10 acres are disturbed and drain to a single point of discharge
- Identify permanent stormwater management system
- Identify erosion prevention practices
- Identify sediment control practices
- Identify dewatering and basin draining practices
- Identify inspection and maintenance practices
- Identify pollution prevention management measures
- Describe the timing of BMP installation
- Location and type of temporary and permanent BMPs
- Include standard plates and specifications of BMPs

A developer of each individual parcel must also follow strict erosion prevention practices which must be installed in an appropriate and functional manner. Some erosion prevention practices may include, but are not limited to:

- Construction phasing
- Vegetative buffer strips
- Temporary seeding
- Sod stabilization
- Horizontal slope grading
- Minimize land disturbance
- Preserve trees and natural vegetation
- Mulch or wood fiber blanket
- Stockpile covers

The developer of each individual parcel must also follow strict erosion control practices as set by the MPCA which must minimize sediment from entering surface waters, curb and gutter systems, and storm sewer inlets. These practices are based on specific site circumstances and may include the following items:

- Protect storm drain inlets
- Control temporary soil stockpiles
- Control vehicle tracking with stone pads, concrete, steel wash racks or equivalent
- BMPs remain until final stabilization
- Silt fences
- Inlet protection
- Check dams
- Sedimentation traps and basins



- Stabilized construction entrances

A developer of each individual parcel is also required to conduct inspections and maintenance. These requirements must:

- Occur every seven days
- Occur within 24 hours of ½" storm
- Occur once a month on finally stabilized area
- Be routinely recorded and kept with the SWPPP
- Ensure the integrity and effectiveness of erosion prevention and sediment control measures
- Repair or replace nonfunctional BMPs
- Drain and remove sediment from basins
- Inspect surface waters, drainage ditches and conveyance systems for sediment
- Remove sediment deposits and stabilize any exposed soil during sediment removal
- Inspect and clean vehicle exits
- Ensure infiltration areas are protected

### **Existing Downstream Conditions**

As stated earlier, this section of the Minnesota River is currently listed as an impaired water with respect to turbidity (TSS), fecal coliform, mercury, and PCB's. The city of Mankato expects that a Total Maximum Daily Load (TMDL) will be developed for these impairments. The Minnesota River is also impaired with low dissolved oxygen during low flows. This TMDL has already been approved and the City is required to reduce phosphorus by 30% based on the year 2000 levels by 2025. The MS4 is required to address this in its Storm Water Pollution Prevention Program (submitted February 15, 2007).

There may also be potential combined issues with other downstream receivers which include the Le Sueur River, the Blue Earth River, and the Minnesota River. The MPCA in collaboration with local government entities and other organizations helps protect our water by monitoring its quality, setting standards and controlling what may go into it. The Minnesota River Basin covers approximately 16,770 square miles, roughly 10 million acres. Thirteen major watersheds in Minnesota drain into the basin. The Minnesota River flows southeast from its source to Mankato then northeast to join the Mississippi River. The AUAR area and its downstream receiving waters is included in the Greater Blue Earth River Basin with several of these waters listed on the TMDL list for various reasons. Several TMDL projects are currently underway and in various stages of completion in the Minnesota River Basin.

Currently most of the AUAR area is drained by County Ditch (CD) 12 otherwise known as Wilson Creek, which drains underneath TH 22 through a 60-inch culvert south of TH 83. The City of Mankato has received notice from a few downstream land owners that Wilson Creek, east of TH 22, has had greater occurrences of erosion in the past few years than what has occurred in the past. Based on known erosion concerns in the downstream channel, preliminary sizing has been performed to reduce discharge rates (and therefore velocity) to below the existing rates.

The proposed stormwater management system for the project area relies on both the traditional detention pond approach and additional stormwater alternatives for peak discharge reduction and flood storage. The ponds and piping were designed to not increase the 'bounce' of the protected waters wetland for the 100-year rainfall event. In addition, to further reduce downstream impacts, it is proposed to decrease the size of the outletting culvert from 60-inches to 30-inches, effectively reducing the peak discharge from the project area to below the pre-developed condition.

Although the proposed stormwater system reduces the peak discharge (and therefore velocities) to less than pre-developed conditions, the duration of the discharge will be increased from the increased runoff volume off new impervious surfaces. To reduce the runoff volume, alternative stormwater management methods will be employed. This will provide actual volume reductions through infiltration, evaporation, and uptake by plants. This will also increase the quality of the runoff, effectively pre-treating the stormwater before it enters the regional ponding system.

## 18. Water quality: wastewaters

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

**Water Quality-Wastewater.** Observe the following points of guidance in an AUAR:

- only domestic wastewater should be considered in an AUAR—industrial wastewater would be coming from industrial uses that are excluded from review through an AUAR process;
- wastewater flows should be estimated by land use subareas of the AUAR area; the basis of flow estimates should be explained; -the major sewer system features should be shown on a map and the expected flows should be identified;
- if not explained under item 6, the expected staging of the sewer system construction should be described;
- the relationship of the sewer system extension to the RGU's comprehensive sewer plan and (for metro area AUARs) to Metropolitan Council regional systems plans, including MUSA expansions, should be discussed. For non-metro area AUARs, the AUAR must discuss the capacity of the RGU's wastewater treatment system compared to the flows from the AUAR area; any necessary improvements should be described;
- if on-site systems will serve part of the AUAR the guidance in "EAW Guidelines" (pages 16-17) should be followed.

The EQB guidance indicates that only domestic wastewater should be considered for this question. Sanitary waste will be produced by residential, commercial, mixed use, office, industrial, and public structures within the AUAR area. No on-site municipal or industrial wastewater treatment is planned for the AUAR area. All sanitary wastewater from the AUAR area will be treated at the Mankato Wastewater Treatment Plant.

The anticipated sanitary sewer flows for the AUAR area is based on the preferred future land use, Scenario C, (Exhibit E-3—Scenario C. Future Land Use Map) and estimates per acre flow generation rates for the different land uses established in the City's current Sanitary Sewer Master Plan. This plan is currently being updated, and the AUAR area comprises a portion of the expanded study area. Table 18-1. lists the various land uses within the AUAR area and provides the estimated acre flow rates utilized to calculate the flow rates for the AUAR area. The flow rates provided are shown as estimated gallons per day per acre (gpd):

**Table 18-1. Peak Flows by Land Use**

|    | Land Use                    | Estimated Flow per Acre (gpd) <sup>1</sup> |
|----|-----------------------------|--|
| 1  | Single Family Residential   | 2,000                                      |
| 2  | Multi Family Residential    | 5,000                                      |
| 3  | General Commercial          | 2,000                                      |
| 4  | Highway Commercial          | 2,000                                      |
| 5  | Civic/School/Institutional  | 5,000                                      |
| 6a | Mixed Residential           | 16,000                                     |
| 6b | Retail                      | 2,000                                      |
| 7  | Neighborhood Commercial     | 2,000                                      |
| 10 | Lifestyle Center Commercial | 2,000                                      |
| 11 | Office Industrial Campus    | 5,000                                      |
| 12 | Mixed Office Commercial     | 2,000                                      |
| 13 | Office/Tech/Flex Space      | 1,500                                      |
| 14 | Industrial/Commercial       | 5,000                                      |
| 16 | Park/Open Space             | 250  |

<sup>1</sup>The estimated quantity of wastewater generated for each land use proposed is based on a peak hourly flow rate. This numbers presented in the table are defined in Section II Design Criteria, Sanitary Sewer Master Plan for Mankato, Minnesota and are used to determine peak flow rates for presently unsewered and/or undeveloped areas .

Exhibit M-1—Sanitary Service Areas & Sub-districts shows the proposed sanitary sewer service districts for the AUAR area. In addition, the larger trunk service areas are divided into sub-districts. A tabular summary of land uses for each of the sanitary sewer sub-districts described in Scenario C is presented in Table 18-2.

**Table 18-2. Scenario C. Land Use Acreage by Sanitary Sub-District**

| Land Use                    | Sanitary Sub-District (in acres) |           |           |           |            |           |           |            |            |            |           |            |            |            |            |            |
|-----------------------------|----------------------------------|-----------|-----------|-----------|------------|-----------|-----------|------------|------------|------------|-----------|------------|------------|------------|------------|------------|
|                             | A1                               | M1        | M2        | B1        | ME1        | ME2       | ME3       | H1         | H2         | H3         | H4        | 83-1       | 83-2       | 83-3       | 83-4       | 83-5       |
| Single Family Residential   |                                  |           |           |           | 33         | 11        | 23        | 49         |            | 23         | 16        | 133        | 34         | 31         | 79         | 179        |
| Multi Family Residential    |                                  |           |           |           |            | 4         |           | 61         | 64         |            | 43        |            | 32         | 1          | 34         | 28         |
| Mixed Residential           |                                  |           |           |           |            |           |           | 11         | 5          |            |           |            | 13         |            |            |            |
| Retail                      |                                  |           |           |           |            |           |           | 11         | 5          |            |           |            | 13         |            |            |            |
| General Commercial          |                                  |           |           |           |            |           |           |            |            |            |           |            |            |            |            |            |
| Highway Commercial          |                                  | 5         | 46        |           |            |           |           |            |            |            |           |            |            |            |            |            |
| Neighborhood Commercial     |                                  |           |           |           |            |           |           |            |            |            |           |            | 12         |            |            | 8          |
| Lifestyle Center Commercial |                                  |           |           |           |            |           |           |            |            | 18         |           |            |            |            |            |            |
| Mixed Office Commercial     | 40                               |           |           |           |            |           |           | 8          |            |            |           |            |            |            |            |            |
| Office/Tech/Flex Space      |                                  |           |           |           |            |           |           | 37         |            |            |           |            |            |            |            |            |
| Industrial/Commercial       | 121                              | 87        | 52        |           | 26         |           |           |            |            |            |           |            |            |            |            |            |
| Office Industrial Campus    |                                  |           |           | 31        | 48         |           |           |            |            | 75         | 14        |            |            |            |            |            |
| Civic/School/Institutional  |                                  |           |           | 19        |            |           |           |            | 17         |            |           |            | 2          | 33         |            |            |
| Park/Open Space             |                                  |           |           |           | 22         | 20        | 74        | 43         | 12         |            | 1         |            | 53         | 59         | 73         |            |
| <b>Total Acres</b>          | <b>161</b>                       | <b>92</b> | <b>98</b> | <b>50</b> | <b>129</b> | <b>34</b> | <b>97</b> | <b>220</b> | <b>103</b> | <b>116</b> | <b>74</b> | <b>133</b> | <b>159</b> | <b>124</b> | <b>186</b> | <b>215</b> |

The anticipated sanitary flows for the AUAR area at full development are presented by sanitary sewer sub-district in the Table 18-3. Flows are in millions of gallons per day (MGD).

**Table 18-3. Peak Flows by Sub-District**

| Sub-District | Peak Flows (MGD) |
|--------------|------------------|
| A1           | 0.6855           |
| M1           | 0.4448           |
| M2           | 0.3519           |
| B1           | 0.2503           |
| ME1          | 0.4408           |
| ME2          | 0.0637           |
| ME3          | 0.0455           |
| H1           | 0.6806           |
| H2           | 0.5007           |
| H3           | 0.4569           |
| H4           | 0.3176           |
| 83-1         | 0.2665           |
| 83-2         | 0.5136           |
| 83-3         | 0.2458           |
| 83-4         | 0.3461           |
| 83-5         | 0.5143           |
| <b>Total</b> | <b>6.1245</b>    |

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies, and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

No on-site sewage systems are proposed in connection with the proposed project.

Composition of the sanitary waste after treatment will meet required standards prior to discharge. The Mankato Wastewater Treatment Plant utilizes physical, biological, and chemical systems to treat the wastewater. Wastewater is screened prior to pumping and sent to the removal facility. Primary clarifiers allow settling and remove phosphorus. The flow from the primary clarifiers is distributed to aeration basins for biological treatment. From these basins the flow travels to secondary clarifiers for separation. The treated water from the secondary clarifiers is disinfected and goes through the final effluent tank and is discharged into the Minnesota River.

Solids removed from the system are thickened to concentrate the solids and then transferred to digesters where it is heated with methane gas. After the required detention time the sludge is transferred to a secondary digester for storage unit which is pumped and filtered for dewatering. The biosolids produced here are stored in a bunker and land applied as fertilizer on nearby farmland in the fall.

The water discharged from Mankato's Treatment Plant is tested daily and meets and exceeds State and Federal water quality standards. The Wastewater Treatment Plan recently received an upgrade that greatly enhanced the quality of water entering the Minnesota River and is designed for use through the year 2020.

The MPCA issued a permit to the City allowing a partnership between the City and Calpine Corporation, an energy production company. Calpine has construct and is now operating a new water reclamation facility adjacent to the City's existing WWTP. The effluent from the WWTP enters Calpine's facility for additional treatment before being routed to Calpine's Mankato Energy Center, a newly constructed power plant. Calpine uses the reclaimed water for processing and cooling. Calpine's facility is designed to provide two additional stages of treatment to wastewater. The first stage involves supplemental phosphorus removal that reduces phosphorus concentrations, and the second stage includes additional filtration and chlorination to ensure a water standard typically reserved for crop irrigation. This facility has increased the capacity of the City's wastewater treatment facilities while creating a beneficial re-use of treated effluent while reducing the amount of phosphorus entering the Minnesota River.

- c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

Sanitary waste from the AUAR area will be treated at the Mankato Wastewater Treatment Plant (See question 18b for treatment information). Using the estimated flows presented in Table 18-3, the sanitary sewer flows produced by the project will be have an estimated peak demand of 6.1245 MGD for Land Use Scenario C.

The Mankato Wastewater Treatment Plant's (WWTP) permitted capacity is 11.25 MGD with a firm treatment capacity of 22.0 MGD and an average design flow of 9.38 MGD. The main lift station for the plant has a firm pumping capacity of up to 44.0 MGD. The joint project with the Calpine power plant project was completed in August 2006. (See 18b for more information). The 2006 average demand for the system was 7.073 MGD (2.58 billion gallons per year).

Development within the AUAR area will increase the number of gallons per day flowing through the Plant. On the basis of the present average daily flow, flows projected for the NEISA AUAR, and the flows projected from development within the AUAR area, full development will likely require revisions of the WWTP's discharge permit. However, the plant is not anticipated to need any improvements to increase treatment capacity as a result of the project.

Sanitary sewer service will be provided to the AUAR area through a series of lateral and trunk sanitary sewer lines. Exhibit M-1—Sanitary Service Areas & Sub-Districts shows a conceptual layout of the trunk system. The trunk lines will generally follow planned road right-of-ways (ROWs) as much as possible. The trunk system shown has sufficient design capacity to convey the anticipated full development flows generated within the AUAR area. The location and configuration of the lateral system (sewer lines smaller than 10-inches) will be determined by final development plans, and thus are not shown at this time.

Along the south border of the AUAR area, adjacent to sub-districts 83-3, and 83-4 are two areas not included within these sub-district service areas. These areas likely cannot be served by the gravity trunk sewers proposed for the AUAR area. Options for providing service to these areas include construction of lift stations discharging to the proposed gravity trunk sewer, or serving these areas with a new trunk sewer from the south. The new trunk sewer option will be investigated as part of the update to the City's Sanitary Sewer Master Plan currently under way.

Area CD-12, shown in Exhibit M-1—Sanitary Service Areas & Sub-Districts, encompasses the large wetland complex. Within this area, there are some existing homes, and some areas with the potential for development. Service to these areas may require small lift stations and/or grinder pumps in order to discharge to the proposed gravity trunks. With the close proximity to the wetland complex, much of this area will likely be utilized as open space, or incorporated into the stormwater management system.

Flows generated within the AUAR area enter the City's existing sanitary sewer system via two existing trunk systems: the Upper Thompson Ravine System and the Glenwood Avenue System (see Exhibit M-1—Sanitary Service Areas & Subdistricts). Analysis of the existing system at full development without the addition of flows from the AUAR area indicates that some existing pipe reaches currently have capacity issues. Improvements to these portions of the existing system will be included in a capital improvements plan (CIP) as part of the City's update to their Sanitary Sewer Master Plan. It should be noted that the analysis of the existing trunk system assumes full development, in other words, that every parcel within the service area has been developed for its intended land use.

An analysis of the existing system with the addition of anticipated peak flows from the AUAR area at full development indicate a number of additional existing pipe reaches with insufficient capacity. Improvements to increase the capacity of these reaches will be incorporated into the CIP as well. The need for these improvements will be driven by the rate at which the AUAR area develops.

The existing Upper Thompson Ravine Trunk System, the Glenwood Avenue Trunk System, and the recommended improvements to be included in the City's CIP for the sanitary sewer system are shown in Exhibit M-2—Improvements Required to Existing Sanitary System, and in Table 18-4 summarizes the recommended improvements by pipe reach. The table includes comments specific to the particular reach and a description of when the recommended improvement will likely need to be constructed.

**Table 18-4. Recommended CIP Projects for Existing Sanitary Trunk System**

|                              | Trunk Sewer Reach     |                       | % Capacity Used - Full Development, Current System <sup>1</sup> | % Capacity Used - Full Development, With Project Area <sup>2</sup> | Comment   | Construct Improvements <sup>3</sup>    |
|------------------------------|-----------------------|-----------------------|---|--|---|--|
|                              | From Upstream Manhole | To Downstream Manhole |   |  |   |  |
| Thompson Ravine Trunk System | 28-029                | 28-028                | 67%   | 111%   | Marginally over capacity at full development. Monitor for surcharging.  | When Needed                            |
|                              | 04-042                | 04-043                | 89%   | 116%   | Add parallel trunk  | 80% Full Development of AUAR Sewershed |
|                              | 04-043                | 04-023                | 192%  | 251%   |   | Near Term                              |
|                              | 03-062                | 03-061                | 91%   | 119%   | Upsize or add parallel trunk  | 40% Development of AUAR Sewershed      |
|                              | 03-060                | 03-004                | 804%  | 933%   | Upsize or add parallel trunk  | Near Term                              |
|                              | 03-004                | 03-002                | 369%  | 428%   |   |  |
|                              | 03-002                | 03-001                | 391%  | 453%   |   |  |
|                              | 03-001                | 02-040                | 271%  | 314%   |   |  |
|                              | 02-040                | 02-035                | 149%  | 173%   |   |  |
|                              | 02-035                | 02-034                | 151%  | 176%   |   |  |
|                              | 02-026                | 02-011                | 136%  | 157%   | Upsize or add parallel trunk  | Near Term                              |
|                              | 02-008                | 02-008A               | 158%  | 182%   | Upsize  | Near Term                              |
| Glenwood Avenue Trunk System | 13-039                | 13-037                | 66%   | 142%   | add parallel trunk  | 45% Development of AUAR Sewershed      |
|                              | 13-023                | 13-022                | 57%   | 116%   | Marginally over capacity at full development. Monitor for surcharging. Upsize if necessary.                             | When Needed                            |
|                              | 13-022                | 13-019                | 70%   | 144%   | Upsize  | 50% Development of AUAR Sewershed      |
|                              | 13-017                | 13-016                | 58%   | 120%   | Marginally over capacity at full development. Monitor for surcharging. Upsize if necessary.                             | When Needed                            |
|                              | 13-003                | 13-002                | 62%   | 128%   | Upsize  | 55% Development of AUAR Sewershed      |
|                              | 13-002                | 13-001                | 63%   | 130%   |   |  |
|                              | 13-001                | 16-010                | 63%   | 129%   |   |  |
|                              | 16-001                | 08-073                | 54%   | 111%   | Marginally over capacity at full development. Monitor for surcharging. Upsize if necessary.                             | When Needed                            |
|                              | 08-073                | 08-072                | 53%   | 110%   |   |  |
|                              | 08-072                | 08-071                | 56%   | 116%   |   |  |
|                              | 08-069                | 08-068                | 84%   | 173%   | Upsize  | 20% Development of AUAR Sewershed      |
|                              | 08-094                | 08-061                | 98%   | 138%   | Parallel trunk, separate flows from Warren Street Trunk, remove flow split at intersection of Broad and Warren Streets. | Near Term                              |
|                              | 08-061                | 08-093                | 139%  | 196%   |   |  |

<sup>1</sup>This is an estimate of the existing pipe capacity used at the peak flow rate for the existing service area assuming all properties are fully developed. It does not include flows from the AUAR area.

<sup>2</sup>This is an estimate of the existing pipe capacity used at the peak flow rate for the existing service area with the addition of the AUAR Area. It assumes all properties are fully developed.

<sup>3</sup>When % of full development of AUAR sewershed is given it is specific to either the Thompson Ravine System, or the Glenwood Avenue System. It does not refer to the entire AUAR sewershed.

d. If the project requires disposal of liquid animal manure, describe disposal technique and location and discuss capacity to handle the volume and composition of manure. Identify any improvements necessary. Describe any required setbacks for land disposal systems.

The proposed project does not generate or require disposal of liquid animal manure.

#### 19. Geologic hazards and soil conditions

a. Approximate depth (in feet) to ground water: 0-1.0' minimum 3.0' average  
to bedrock: 150' minimum 200-250' average

**Geologic hazards and soil conditions.** A map should be included to show any groundwater hazards identified. A standard soils map for the area should be included.

The depth to groundwater is provided in the Blue Earth County Soil Survey. In the areas with a lower elevation, the depth to the water table is 1.0' or less while areas up gradient may have up to 6.0' to the water table.

Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

There are no known sinkholes, shallow limestone formations, or karst conditions observed on or adjacent to the site according to the DNR's Karst Features Database. If such features are encountered on the site, actions will be taken to mitigate potential effects such as soil stabilization, stormwater routing, and groundwater protection practices.

b. Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil granularity and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

The following table lists the soils found onsite with the family or higher taxonomic class also listed. Soils information is from the Blue Earth County Soil Survey. See Exhibit I—Soil Classifications & Features Map for additional information.

**Table 19-1. Mapped Soils**

| Soil Symbol | Soil Name                             | Family or Higher Taxonomic Class                                     |
|-------------|---------------------------------------|--|
| 84          | Brownton silty clay loam              | Vertic Endoaquolls, fine, smectitic, calcareous, mesic               |
| 86          | Canisteo silty clay loam, 0-2% slope  | Typic Endoaquolls, fine-loamy, mixed, superactive, calcareous, mesic |
| 106B        | Lester loam, 2-6% slope               | Mollic Hapludalfs, fine-loamy, mixed, superactive, mesic             |
| 106C        | Lester loam, 6-12% slope              | Mollic Hapludalfs, fine-loamy, mixed, superactive, mesic             |
| 109         | Cordova clay loam, 0-2% slope         | Typic Argiaquolls, fine-loamy, mixed, superactive, mesic             |
| 110         | Marna silty clay loam                 | Vertic Endoaquolls, fine, smectitic, mesic                           |
| 114         | Glencoe silty clay loam, 0-2% slope   | Cumulic Endoaquolls, fine-loamy, mixed, superactive, mesic           |
| 211         | Lura silty clay                       | Cumulic Vertic Eqiaquolls, fine, smectitic, mesic                    |
| 239         | Le Sueur clay loam, 1-3% slope        | Aquic Argiudolls, fine-loamy, mixed, mesic                           |
| 286         | Shorewood silty clay loam, 1-6% slope | Aquic Argiudolls, fine, montmorillonitic, mesic                      |
| 287         | Minnetonka silty clay                 | Vertic Arguaquolls, fine, smectitic, mesic                           |
| 525         | Muskego muck, 0-2% slope              | Limnic Medisaprists, coprogenous, euic, mesic                        |
| 539         | Palms muck, 0-2% slope                | Terric Medisaprists, loamy, mixed, euic, mesic                       |
| 997         | Marna-Barbert complex, 0-2% slope     | Typic Haplaquolls & Argialbolls, fine, montmorillonitic, mesic       |
| 998         | Minnetonka-Barbert complex            | Vertic Argiaquolls & Argialbolls, fine smectitic, mesic              |

#### Potential for Groundwater Contamination

According to the MPCA's Groundwater Contamination Susceptibility (1989) map, the potential for groundwater contamination is estimated to be at a low to medium level of susceptibility

## 20. Solid wastes, hazardous wastes, storage tanks

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

***Solid wastes; hazardous wastes; storage tanks.** For a, generally only the estimated total quantity of municipal solid waste generated and information about any recycling or source separation programs of the RGU need to be included. No response is necessary for b. For c, potential locations of storage tanks associated with commercial uses in the AUAR should be identified (e.g., gasoline tanks at service stations).*

The City of Mankato contracts with Waste Management to provide curbside refuse and recycling services within the city limits. Refuse is processed and burned – only 15% of Mankato's refuse collected is landfilled. Refuse and recycling is picked up once a week.

Waste and debris from construction activities will temporarily generate waste on the site. The amount of construction wastes will be typical of a construction project. Contractors will dispose of any wastes generated at the site in an approved facility and according to City of Mankato's Ordinance.

After construction, solid waste will be generated within the AUAR area associated with residential, commercial, industrial, and mixed-use development. All solid waste will be handled by a City of Mankato licensed solid waste hauler. All solid wastes will be managed in accordance with ordinances of the City of Mankato

According to the MPCA, commercial entities that produce any amount of hazardous waste are regulated as hazardous-waste "generators" with requirements that depend upon the amount of waste they produce. These requirements are part of the federal Resource Conservation and Recovery Act (RCRA) and Minnesota Hazardous Waste Rules, designed to protect people and the environment from the effects of improper management of hazardous wastes from commercial sources. All hazardous wastes generated at the site will be handled in accordance to MPCA guidelines and Minnesota Hazardous Waste Rules.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

The EQB guidance indicates that no response is necessary in an AUAR for this question.

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

There is no indication any tanks currently exist in the AUAR area.

Gas stations are permitted uses within most of the commercial and industrial-related land use districts. The potential location of a gas station is likely near major roadways. If this is the case, below ground storage tanks for petroleum storage would be present. These tanks would be required to be registered with the MPCA and must comply with state law and regulations regarding such facilities.

## 21. Traffic.

Parking spaces added see below. Existing spaces (if project involves expansion) N/A.

Estimated total average daily traffic generated see below. Estimated maximum peak hour traffic generated



(if known) and time of occurrence: see below. Provide an estimate of the impact on traffic congestion on affected roads and describe any traffic improvements necessary. If the project is within the Twin Cities metropolitan area, discuss its impact on the regional transportation system.

**Traffic.** For most AUAR reviews a relatively detailed traffic analysis will be needed, especially if there is to be much commercial development in the AUAR area or if there are major congested roadways in the vicinity. The results of the traffic analysis must be used in the response to item 22 and to the noise aspect of item 24.

Instead of responding to the information called for in item 21, the following information should be provided:

—a description and map of the existing and proposed roadway system, including state, regional, and local roads to be affected by the development of the AUAR area. This information should include existing and proposed roadway capacities and existing and projected background (i.e., without the AUAR development) traffic volumes;

—trip generation data —trip generation rates and trip totals—for each major development scenario broken down by land use zones and/or other relevant subdivisions of the area. The projected distributions onto the roadway system must be included;

—analysis of impacts of the traffic generated by the AUAR area on the roadway system, including: comparison of peak period total flows to capacities and analysis of Levels of Service and delay times at critical points (if any);

—a discussion of structural and non-structural improvements and traffic management measures that are proposed to mitigate problems;

Note: in the above analyses the geographical scope must extend outward as far as the traffic to be generated would have a significant effect on the roadway system and traffic measurements and projections should include peak days and peak hours, or other appropriate measures related to identifying congestion problems, as well as ADTs.

Road construction and improvements will occur as a result of development in the AUAR area. CSAH 12 will be extended starting to the north with an interchange at US Hwy 14 and continuing south to Trunk Highway (TH) 83 to accommodate future growth in the area. The interchange at US Hwy 14 was studied as part of the Northeast Industrial Service Area AUAR (2005) located directly north of the AUAR area and a separate Environmental Assessment Worksheet (EAW) was completed for the CSAH 12 extension. New internal road alignments have been proposed for the extensions of Adams Street, Bassett Drive, and Hoffman Road (See Exhibit L—Area Transportation System). Additional collector roads will be necessary, but the final layout and locations have not been determined.

Due to the size of this development in comparison to the surrounding area, traffic levels will be substantially affected. A map of the existing transportation routes in the AUAR area can be found in Exhibit L—Area Transportation System. Alternative, multi-modal transportation can also be addressed with the use of sidewalks and pedestrian paths.

The mixed land use and gateway nodes planned for the area will promote the integration of transit-oriented development through coordinated land use, transportation planning and investment, and building design so the resulting pattern is supportive of transit ridership, walking, and other pedestrian activity. The city of Mankato is currently in the process of developing a Bus Rapid Transit (BRT) system which is planned to be part of an integrated transportation system with the city and campus populations primary feeding the BRT. The BRT is a new form of public transportation that uses public roads, right-of-way, and transit advantages to provide dependable, high-speed bus service. BRT supports integrated transit land use planning (zoning, redevelopment, etc) connecting transit stations to locations where people live and work.

Pedestrians, bicycle, and park and ride opportunities will link to transit hubs. The primary hubs identified in the greater Mankato area include the residential population, downtown, office, academic, and activity centers. The BRT also includes secondary stops connecting other residential areas to the major hubs while creating a quick route with few stops. The project area has identified two primary gateway nodes that will serve as transit hubs. Including the areas of Hoffman Road – a retail and residential destination typical of traditional neighborhood design, with higher-density housing than in any other location in the project area, and CSAH 12 and Bassett Drive and CSAH 12 – which is intended to

bring significant identity to the project area as an entertainment and retail destination with the planned land use of a lifestyle center on the north side of the intersection. These two nodes provide community-wide destinations and will service areawide needs for circulation and mobility and will connect this area to other primary nodes around the greater Mankato area.

SRF Consulting Group, Inc. conducted a traffic study as part of the Greater East Mankato Infill Service District AUAR to assist the City in planning for future infrastructure in the City's eastern region (see Appendix E—Transportation, Air, and Noise Analysis). This study presents the traffic-related impacts of future development in the AUAR area and identifies the transportation infrastructure necessary to support development in this area. The mixed-use development of this project results in a very broad estimation of traffic and parking space projections. Estimating parking spaces and traffic can vary considerably depending on the time of year and also with the types of commercial land use.

The traffic study analyzed PM peak hour traffic conditions under existing (2006) conditions and under the future build-out conditions listed below. The City views the future build-out condition as the City's long range plan for this area and anticipates that these conditions may be reached within the next 50 years. The analysis focused on the PM peak hour because of the substantial amount of commercial land use anticipated in the area (the PM peak hour is the 'most intensive' scenario for these conditions).

- Existing (2006) Conditions
- Future Build-Out Year without AUAR development
- Future Build-Out Year with AUAR development

The land uses for Scenarios A (Exhibit E-1—Scenario A. Future Land Use Map), Scenario B (Exhibit E-2—Scenario B. Future Land Use Map), and Scenario C (Exhibit E-3—Scenario C. Future Land Use Map) are shown and summarized in Table 21-1:

**Table 21-1. 2006 Build-Out Land Use Summary**

| <b>Future Land Use Type</b> | <b>Acres</b> |
|-----------------------------|--------------|
| Commercial                  | 129          |
| Industrial                  | 249          |
| Office                      | 295          |
| Single Family Residential   | 600          |
| Multi-Family Residential    | 283          |

### **Existing Conditions**

To understand how the existing transportation system operates in the study area, the study team analyzed existing traffic conditions within the study area. Figure 3 (shown in Appendix E) illustrates existing geometrics, traffic controls, and PM peak hour traffic volumes that were collected in June 2006 at the following key intersections:

- TH 22 and County State Aid Highway 3 (CSAH 3)
- TH 22 and TH 14 North Ramp
- TH 22 and TH 14 South Ramp
- TH 22 and Adams Street
- TH 22 and Madison Ave. (CSAH 17)
- TH 22 and Bassett Drive
- TH 22 and Hoffman Road
- TH 22 and TH 83

- County Road 86 and Madison Ave. (CSAH 17)
- County Road 86 and TH 83

An operations analysis was conducted for the PM peak hour at each of the key intersections to determine how traffic currently operates within the AUAR area. All signalized intersections were analyzed using Synchro/SimTraffic software, while unsignalized intersections were analyzed using Highway Capacity Software. Operations analysis results identify a Level of Service (LOS), which indicates how well an intersection is operating. The LOS results are based on average delay per vehicle. Intersections are given a ranking from LOS A through LOS F. Level of Service A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS A through D is generally considered acceptable by drivers.

For the analysis of side-street stop controlled intersections, the operations can be described in two ways. In Table 21-2, the intersections with two levels of service indicate side-street stop controlled intersections. The first level of service shown is the overall intersection level of service, which provides the average delay per vehicle for all approaches. However, it is important to note that at an intersection with side-street stop control, traffic on the major street does not stop and the majority of delay is experienced by vehicles that are stopped on the side street. To reflect this condition, level of service is reported for both the overall intersection and the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during the peak periods.

Results of the analysis shown in Table 21-2 indicate that the intersections are currently operating at an acceptable overall LOS C or better in the PM peak hour, with existing traffic controls and geometric layout.

**Table 21-2. Level of Service Results for Existing Conditions**

| Intersection   | PM Peak LOS |
|--|-------------|
| TH 22 and CSAH 3   | B           |
| TH 22 and TH 14 North Ramp                               | A           |
| TH 22 and TH 14 South Ramp                               | A           |
| TH 22 and Adams Street                                   | C           |
| TH 22 and Madison Avenue                                 | C           |
| TH 22 and Bassett Drive                                  | C           |
| TH 22 and Hoffman Road                                   | B           |
| TH 22 and TH 83  | C           |
| County Road 86 and CSAH 17 (Madison Avenue) <sup>1</sup> | C/C (EB)    |
| County Road 86 and TH 83 <sup>1</sup>                    | B/C (EB)    |

**Notes**

<sup>1</sup>Unsignalized intersection. The level of service for the overall intersection is shown followed by the worst level of service on the stopped side streets. The worst side street approach is denoted in parenthesis (e.g., EB = Eastbound approach).

### Future Build-Out Analysis

The purpose of an AUAR traffic study is to test the impact of the land use scenario and develop strategies to mitigate its impact. To isolate the effects of development within the AUAR area, the study analyzed future traffic conditions with and without development in the AUAR area, since the land use assumed outside the AUAR area is substantial.

The study used the background development, AUAR land use assumptions, and Institute of

Transportation Engineers (ITE) trip generation rates to develop trip generation estimates for the PM peak hour for each area of development. The added trips were used along with existing travel patterns (as shown in Figure 4—Appendix E) in Traffix software to develop turn movements at the study intersections. Once turning movements were produced at each intersection, some adjustments were made to volumes to balance between the TH 14/TH 22 interchange and the TH 14/CSAH 12 interchange. Volumes were also adjusted to account for balancing between several left/right turning movements along TH 22. The final turning movements were put into a Synchro/SimTraffic model for operations analysis.

A Table is provided in Appendix E that summarizes the Future Build-Out land use assumptions (Table 3—Appendix E). The number of peak hour trips generated by the entire study area (inside and outside the AUAR are) range from 35 to 40 percent higher compared to trips generated by the 2005 Northeast Industrial Service Area AUAR Traffic Study.

### **Assumed Roadway Improvements and Results of Build-Out Analysis**

#### Future Base Road Network

The future land use assumed outside of the AUAR area is consistent with the 2005 Northeast Mankato AUAR assumptions. Because of these substantial growth assumptions, the study team assumed that a roadway network would be added parallel to TH 22 to relieve congested intersections. Figure 5 (shown in Appendix E) shows that added roadways include the following (light-weight dashed lines):

- CSAH 12 extension from Madison Avenue to north of CSAH 3
- TH 14/CSAH 12 interchange
- CR 86 Overpass at TH 14

These improvements are consistent with the base roadway network assumed in the 2005 Northeast Mankato AUAR traffic study. All intersections analyzed on the new CSAH 12 corridor were assumed to be side-street stop controlled. Figure 5 (shown in Appendix E) shows the following intersections were added to the analysis:

- CSAH 12 and Madison Avenue
- CSAH 12 and TH 14 South Ramps
- CSAH 12 and TH 14 North Ramps

Even with these improvements, Table 4 shows that the Base Network roadway system is not capable of supporting even the background development as most analyzed intersections on TH 22 operate at LOS E.

#### Recommended 2005 Northeast Mankato AUAR Roadway Improvements

Because several intersections operated poorly with the base roadway network, the study team identified initial improvements to the roadway geometrics and signal phasing needed to support the background growth. Figure 6 (shown in Appendix E) illustrates the geometric improvements required to address the majority of the operational problems caused by growth outside the AUAR area. In addition to these geometric improvements, overlapping right turn signal phasing (the right turn receives a green arrow at the same time as a complimentary left turn) was added to all signalized intersections along the TH 22 Corridor with the exception of the TH 14 Ramp intersections.

With these improvements, Table 21-4 shows that all intersections operate at LOS D if there is no development in the AUAR area.

#### 2006 AUAR Build-Out Network

Before analyzing the roadway network with traffic produced by the 2006 AUAR study area's development, the study team extended several roadways. Figure 5 shows the key roadways include the following (heavy dashed lines):

- CSAH 12 extension from Madison Avenue to TH 83 (four lanes with turn lanes at

intersections)

- 586th Street from Adams Street to CSAH 12 (two lanes with turn lanes)
- Bassett Drive extension from east of TH 22 to east of CR 86 (two lanes with turn lanes)
- Hoffman Road extension from east of TH 22 to east of CR 86 (four lanes with turn lanes to CSAH 12, two lanes with turn lanes east of CSAH 12)
- Adams Street extension from east of TH 22 to Hoffman Road (four lanes with turn lanes from east of TH 22 to Madison Avenue, two lanes with turn lanes from Madison Avenue to Hoffman Road)

Figure 5 (shown in Appendix E) also shows the following intersections were added to the analysis:

- CSAH 17 and 586th Street
- CSAH 12 and Hoffman Road
- CSAH 12 and TH 83
- CSAH 12 and Bassett Drive
- CSAH 12 and Adams Street
- CSAH 17 and Adams Street
- Hoffman Road and CR 86

With this network, Table 21-4 (Appendix E) shows several intersections operate at LOS E or F including the following intersections: TH 22/CSAH 3, TH 22/Adams Street, TH 22/Madison Avenue, CSAH 12/Basset Drive, CSAH 12/Madison Avenue, and Madison Avenue/Adams Street, and the TH 14 interchange ramps.

#### Recommended 2006 AUAR Build-Out Final Roadway Improvements

To accommodate the additional traffic generated by development within the AUAR area, the study team analyzed additional roadway improvements beyond those initially added. Figure 7 (Appendix E) shows the identified improvements were:

- Madison Avenue - four lanes with turn lanes are needed from CSAH 12 to CR 86
- TH 83 - four lanes with turn lanes are needed from west of TH 22 to CSAH 12
- Dual left turn lanes were also added at several intersections along TH 22 and CSAH 12.

With the final improvements, table 5 (Appendix E) shows that all intersections performed at acceptable LOS D or better.

#### **Findings and Recommendations**

- Under Build-Out development conditions, development in the AUAR area generates 8,673 trips in the PM peak hour. The AUAR development trips comprise 50 percent of the total number of PM peak hour trips. Together, the AUAR and background growth in trips are 35 to 40 percent higher than the trips generated in the Northeast Industrial Service Area AUAR Traffic Study.
- With background growth only and no development in the AUAR area, Table 21-3 shows improvements are needed on the roadway network. Improvements include 6 lanes on TH 22, 4 lanes on Adams Street as it approaches TH 22, and extending 4 lanes on CSAH 3 and Madison Avenue to the CSAH 12 extension.
- The roadway network would be extended to provide access in the AUAR area. The study results confirmed the following:
  - *At least* 200 feet of right-of-way should be preserved for the CSAH 12 extension, and it should be constructed with four lanes (i.e., two through lanes in each direction) and turn lanes at intersections.
  - Four travel lanes (i.e., two through lanes in each direction) with turn lanes are needed on Adams Street and Hoffman Road from TH 22 to CSAH 12.

- Table 21-3 shows the extended network should also include more capacity than initially planned. Four through lanes with turn lanes at intersections are also needed on Madison Avenue and TH 83. Dual left turn lanes are needed at several intersections as well.
- The City of Mankato, Blue Earth County, and the Minnesota Department of Transportation should work together to preserve right-of-way in and limit access to the CSAH 3, CSAH 12, Madison Avenue, TH 22, and TH 83 corridors. These roadways are anticipated to have high traffic demands and serve important roles in the network. Their importance will continue to increase as the Mankato area continues to develop.

**Table 21-3. Summary of Roadway Improvements**

| Improvements   | No AUAR Development <sup>1</sup> | AUAR Development <sup>2</sup> | 2005 NE Mankato AUAR Findings <sup>3</sup> |
|--|----------------------------------|-------------------------------|--|
| <i>Improvements to Existing Road Network</i>   |                                  |                               |  |
| A. Six-lane TH 22 (Hoffman Rd. to north of CSAH 3)   | ✓                                | ✓                             | ✓<br>Bassett Drive to north of CSAH 3      |
| B. Four-lane Madison Avenue with turn lanes  |                                  |                               |  |
| ▪ TH 22 to CSAH 12   | ✓                                | ✓                             | ✓  |
| ▪ CSAH 12 to CR 86   |                                  | ✓                             |  |
| C. Four-lane Adams Street  |                                  |                               |  |
| ▪ Immediately west and east of TH 22   | ✓                                | ✓                             | ✓  |
| D. Four-lane CSAH 3 (Excel to CSAH 12) with turn lanes                                       | ✓                                | ✓                             | ✓  |
| E. Left turn lane with right turn lanes for:   |                                  |                               |  |
| ▪ West approach of TH 22/TH 83 intersection  | ✓                                | ✓<br>(Dual left)              |  |
| ▪ East approach of TH 22/TH 83 intersection  |                                  | ✓                             |  |
| F. Dual left turn lanes with right turn lanes for:   |                                  |                               |  |
| ▪ East approach at TH 22/CSAH 3 intersection   | ✓                                | ✓                             | ✓<br>All Approaches                        |
| ▪ All approaches but south approach at TH 22/Adams Street                                    | ✓                                | ✓                             | ✓<br>All Approaches                        |
| ▪ West approach at TH 22/Madison Ave intersection  | ✓                                | ✓                             | ✓  |
| ▪ All other approaches (north, south, and east) at TH 22/Madison Ave intersection            |                                  | ✓                             | ✓  |
| ▪ West approach at TH 22/Hoffman Road intersection   |                                  | ✓                             |  |
| ▪ West approach at TH 22/CSAH 3 intersection   |                                  | ✓                             | ✓<br>All Approaches                        |
| G. Four-lane TH 83 (west of TH 22 to CSAH 12)  |                                  | ✓                             |  |
| H. Channelized Yield Right at TH 14 South Ramp/TH 22 intersection                            |                                  | ✓                             |  |
| I. Signalize the Madison Avenue/CR 86 intersection and add left turn lanes at all approaches | ✓                                | ✓                             |  |
| J. Overlapping right turn signal phasing for all intersection approaches at::                |                                  |                               |  |
| ▪ TH 22/CSAH 3   | ✓                                | ✓                             | ✓<br>West Approach Only                    |
| ▪ TH 22/Adams Street   | ✓                                | ✓                             | ✓<br>East Approach Only                    |
| ▪ TH 22/ Madison Avenue  | ✓                                | ✓                             | ✓<br>East Approach Only                    |
| ▪ TH 22/Bassett Drive  | ✓                                | ✓                             | ✓<br>East Approach Only                    |
| ▪ TH 22/Hoffman Road   | ✓                                | ✓                             |  |
| ▪ TH 22/TH 83  | ✓                                | ✓                             |  |
| K. Overlapping right turn signal phasing for all intersection approaches at::                |                                  |                               |  |
| ▪ TH 22/CSAH 3   | ✓                                | ✓                             | ✓<br>West Approach Only                    |

*Continued on next page...*

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| Improvements   |  | No AUAR Development <sup>1</sup> | AUAR Development <sup>2</sup> | 2005 NE Mankato AUAR Findings <sup>3</sup> |
|--|--|----------------------------------|-------------------------------|--|
|  | TH 22/Adams Street   | ✓                                | ✓                             | ✓<br>East Approach Only                    |
|  | TH 22/ Madison Avenue  | ✓                                | ✓                             | ✓<br>East Approach Only                    |
|  | TH 22/Bassett Drive  | ✓                                | ✓                             | ✓<br>East Approach Only                    |
|  | TH 22/Hoffman Road   | ✓                                | ✓                             |  |
|  | TH 22/TH 83  | ✓                                | ✓                             |  |
| <i>Improvements to Existing Road Network</i>   |  |                                  |                               |  |
| <i>Improvements to Extended Road Network (Improvements beyond Initial Assumptions)</i> |  |                                  |                               |  |
| K.   | Dual left turn lanes with right turn lanes for:                            |                                  |                               |  |
|  | ▪ North, south, and west approaches at Madison Avenue/CSAH 12 intersection | n/a                              | ✓                             | n/a  |
|  | ▪ South approach at TH 14/CSAH 12 North Ramp                               | n/a                              | ✓                             | n/a  |
|  | ▪ East approach at TH 14/CSAH 12 South Ramp                                | n/a                              | ✓                             | n/a  |
|  | ▪ North and West approaches at CSAH 12/Bassett Drive intersection          | n/a                              | ✓                             | n/a  |
| L.   | Overlapping right turn signal phasing for all intersection approaches at:  |                                  |                               |  |
|  | ▪ Madison Avenue/586th Street  | n/a                              | ✓                             | n/a  |
|  | ▪ CSAH 12/Hoffman Road   | n/a                              | ✓                             | n/a  |
|  | ▪ CSAH 12/Bassett Drive  | n/a                              | ✓                             | n/a  |
|  | ▪ CSAH 12/Madison Avenue   | n/a                              | ✓                             | n/a  |
|  | ▪ CSAH 12/Adams Street   | n/a                              | ✓                             | n/a  |
|  | ▪ Madison Avenue/Adams Street  | n/a                              | ✓                             | n/a  |

(1) Check indicates improvement needed to address development outside the AUAR area.

(2) Shaded cell with check indicates improvement needed to address AUAR development.

(3) Check indicates consistency with 2005 Northeast Mankato AUAR Traffic Study. Included for comparison purposes only.

## 22. Vehicle-related air emissions.

Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts. Note: If the project involves 500 or more parking spaces, consult *EAW Guidelines* about whether a detailed air quality analysis is needed.

**Vehicle-related air emissions.** The guidance provided in “EAW Guidelines: should also be followed for an AUAR. Mitigation proposed to eliminate any potential problems may be presented under item 21 and merely referenced here. The MPCA staff should be consulted regarding possible ISP requirements for certain proposed developments; although the RGU may not want to assume responsibility for applying for an ISP for specific developments, it may be desirable to coordinate the AUAR and ISP analyses closely.

Information regarding vehicle-related air emissions was provided by SRF Consulting (See Appendix E—Transportation, Air & Noise Analysis.

Motor vehicle air quality issues are most frequently associated with carbon monoxide (CO) emissions and the concentrations of those emissions. The MPCA's 1-hour and 8-hour standards for CO concentrations are 30 parts per million (ppm) and 9 ppm, respectively.

Concentrations of CO are generally highest at intersections with poor levels of service and, consequently, more idling vehicles. An air quality analysis was performed to predict carbon monoxide concentrations at the worst performing intersections in the proposed area. The air quality analysis incorporates projected afternoon peak hour traffic volumes (including

site-generated traffic) representing conditions for the year 2007. Carbon monoxide concentrations were projected using the Environmental Protection Agency (EPA) Mobile 6 emission model and the CAL3QHC dispersion model.

As described in the traffic study, ten key intersections within the AUAR area were analyzed to determine levels of service. Carbon monoxide analysis was performed at the worst operating intersection. The intersection of TH 22 and CSAH 17 was selected as “most intensive” intersection because this intersection operates at a lower level of service than the others in the study area.

The modeling assumptions used in this analysis were as follows:

| <b>Analysis Years</b>  | <b>2007</b>                  |
|------------------------|------------------------------|
| Traffic Mix:           | National default values      |
| Cruise Speed:          | Posted speed limits          |
| Cold Start Percentage: | 20.6 percent for all traffic |
| Hot Start Percentage:  | 27.3 percent for all traffic |
| Wind Speed:            | 1 meter/second               |
| Temperature:           | -8.8 degrees Celsius         |
| Surface Roughness:     | 108 centimeters              |
| Stability Class:       | D                            |

#### **Background Carbon Monoxide Levels**

Background CO concentrations represent conditions without the influence of nearby vehicles. By definition, the background CO concentration in any particular area is that concentration which exists independently of direct contributions from nearby traffic. The background concentrations are added to intersection-scale modeled results to yield predicted CO levels.

Default Background CO concentrations were obtained from the Minnesota Pollution Control Agency. For purposes of the analysis, these background concentrations were adjusted for region-wide increases in traffic volumes. To represent worst-case conditions, there were no reductions of background concentrations to account for vehicle emissions and temperature. The results are summarized in Table 1.

**Table 22-1. Calculation of CO Background Concentrations**

| <b>Factor</b>                                    | <b>2007</b>       |                   |
|--|-------------------|-------------------|
|  | <b>1-Hour Ave</b> | <b>8-Hour Ave</b> |
| MPCA Default 2006 Background Concentration (ppm) | 3.0               | 2.0               |
| Background Traffic Volume Adjustment Factor      | 1.03              | 1.03              |
| Worst-Case Background Concentration (ppm)        | 3.1               | 2.1               |

#### **Carbon Monoxide Modeling Results**

Future CO concentrations were analyzed based on peak hour traffic volumes, optimized signal timing, and proposed intersection geometrics. Analyses were performed for the year 2007.

The sidewalk averaging technique was used to predict the average CO concentration along each sidewalk adjacent to the analyzed intersection. Receptors are placed parallel to each leg of the intersection along each sidewalk at 10 meters and 50 meters from the intersection. The average of the two receptors is considered the average concentration for that sidewalk. The listed result shows the maximum of the eight sidewalks adjacent to the



intersection.

Table 2 presents the worst-case CO concentrations at the modeled intersection. The wind direction column indicates the wind direction that resulted in the worst-case conditions for that analysis location and time. The 1-hour and 8-hour average modeling results are below the state standards for all conditions modeled.

**Table 22-2. Future Modeled Carbon Monoxide Concentrations** -in parts per million (ppm)

| TH 22 and CSAH 17                        | 1-Hour Ave  | 8-Hour Ave | Wind Direction <sup>1</sup> |
|--|-------------|------------|-----------------------------|
| Modeled CO Concentrations                | 1.1         | 0.8        |                             |
| Background CO Concentrations             | 3.1         | 2.1        |                             |
| <b>Total Predicted CO Concentrations</b> | <b>4.2</b>  | <b>2.9</b> | <b>140</b>                  |
| <b>State Standards</b>                   | <b>30.0</b> | <b>9.0</b> |                             |

<sup>1</sup>Degree from North

### Conclusions

Based upon the traffic analysis and CO analysis, development in the AUAR area will not result in adverse impacts to air quality. The CO analysis considered the broader, cumulative effects of anticipated development and the resulting traffic congestion.

Predicted CO concentrations at the analyzed intersection will be below state standards in 2007. Because this intersection is the 'most intensive' intersection in terms of level of service and total delay, CO concentrations at other intersections in the study area would likely be lower than that predicted at the analyzed intersection.

### 23. Stationary source air emissions.

Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

**Stationary source air emissions.** This item is not applicable to an AUAR. Any stationary air emissions source large enough to merit environmental review requires individual review.

The EQB guidance indicates that no response is necessary in an AUAR for this question.

New buildings constructed at the AUAR area will likely be heated by natural gas mechanical systems. The projected emissions from such systems will include small amounts of carbon dioxide, nitrous oxides, and very small amounts of other byproducts. All emissions are expected to be below thresholds for new source permitting. Effects on air quality from the project are expected to be negligible. All tenants will be required to obtain any required air emission permits.

Any stationary air emissions sources that will generate 250 tons or more per year will require an individual environmental review per MN Rules 4410.4300, Sub. 15.

### 24. Odors, noise and dust.

Will the project generate odors, noise or dust during construction or during operation? ☒ Yes ☐ No

If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

**Dust, odors, noise.** *Dust, odors, and construction noise need not be addressed in an AUAR, unless there is some unusual reason to do so. The RGU might want to discuss as part of the mitigation plan, however, any dust control or construction noise ordinances in effect. If the area will include or adjoin major noise sources a noise analysis is needed to determine if any noise levels in excess of standards would occur, and if so, to identify appropriate mitigation measures. With respect to traffic-generated noise, the noise analysis should be based on the traffic analysis of item 21.*

### **Odors and Dust During Construction**

The EQB guidance indicates that dust, odors, and construction noise need not be addressed in an AUAR, unless there is some unusual reason to do so. Minor temporary odors may occur from heavy equipment resulting from construction activities. The nearest sensitive receptors are the homesteads within the AUAR area and the residential subdivisions located to the west of the AUAR area across TH 22.

Dust and noise common to development will be generated during road and utility extensions and construction activities. Dust generated during construction would be minimized through standard dust control measures such as watering. After construction is complete, dust levels are anticipated to be minimal because previously exposed soil surfaces will be in permanent cover (e.g., impervious surface or vegetated areas).

### **Construction Noise**

Noises common to building construction will be generated during road and utility extensions and construction activities. The noise levels that may be experienced near a construction zone are dependant upon:

- The distance between the construction equipment and the receiver
- The type of construction equipment in use
- The percentage of time that the construction equipment attains its peak noise level
- Noise control features incorporated into the construction equipment

Construction activities will need to be conducted in conformance with the City's noise ordinance. Noise from construction activities will be limited to 6:30 am to 6:30 pm weekdays, with Saturday hours limited to 7:30 am to 4 pm. No construction is permitted to occur on Sundays. Construction equipment would be fitted with mufflers, which would be maintained during the construction process.

### **Traffic Noise**

A technical memorandum was prepared by SRF Consulting to document the methods and results of a traffic noise analysis completed for the AUAR area. This analysis focused on impacts to existing residential locations surrounding the AUAR area, as well as predicting future noise levels at selected planned residential land uses within the AUAR area.

After project construction, the potential sources of noise from development within the AUAR area, based on future land use assumptions, are essentially limited to traffic noise. Traffic noise is a common source of noise in a developed setting and is regulated in Minnesota by the Minnesota Pollution Control Agency (MPCA) under Minnesota Statute 116.07 Subd. 2 and 4.

The AUAR area is currently located in a relatively undeveloped and rural setting; however, some adjacent lands are developed including residential and commercial land uses to the west, and industrial land uses to the north. Rural/agricultural land uses are located to the south and east of the AUAR area. High volume roads such as US 14, TH 22, and TH 83 also pass near the AUAR development area. Vehicle traffic is the major noise source for receptors adjacent to these roadways.

A noise analysis was completed to assess existing noise levels in the AUAR area and to determine what effect the project would have on future noise levels. The analysis consisted on monitoring and modeling existing noise levels and predicting future noise levels using computer models. Noise analysis was conducted for existing (year 2006), year

2030 No Build and year 2030 Built traffic conditions. The traffic noise models for the year 2030 Built conditions were based on land use scenarios that were anticipated to generate the highest traffic volumes, and therefore represent the worst-case conditions in regards to traffic noise.

### **Background/Regulatory Framework**

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic increase in sound energy relative to a reference energy level. A sound increase of 3 dB is barely perceptible to the human ear, a 5 dB increase is clearly noticeable, and a 10 dB increase is heard as twice as loud. For example, if the sound energy is doubled (i.e., the amount of traffic doubles), there is a 3 dB increase in noise, which is just barely noticeable to most people. If traffic increases 10 times the sound energy level over a reference level, then there is a 10 dB increase and it is heard as twice as loud.

To approximate the way that an average person hears sound, an adjustment, or weighting, of the high- and low- pitched sounds is made. The adjusted sound levels are stated in units of “A-weighted decibels” (dBA). Traffic noise is variable and it is therefore best measured and regulated using statistical descriptors. These descriptors are denoted as  $L_x$ , with the x indicating a percentage of a time period that a noise level is exceeded. In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hours of the day and/or night that have the heaviest traffic. These noise levels are identified as the  $L_{10}$  and  $L_{50}$  levels. For example, an  $L_{10}$  value of 65 decibels means that the noise level was at or greater than 65 decibels during 10 percent of the measurement period (i.e., more than 6 minutes per hour). Common noise levels from various indoor and outdoor sources are listed in Table 24-1 below.

**Table 24-1. Decibel Levels of Common Noise Sources**

| Noise Source               | Sound Pressure Level (dBA) |
|----------------------------|----------------------------|
| Jet Engine (at 75 feet)    | 140                        |
| Jet Aircraft (at 300 feet) | 130                        |
| Rock and Roll Concert      | 120                        |
| Pneumatic Chipper          | 110                        |
| Jointer/Planer             | 100                        |
| Chainsaw                   | 90                         |
| Heavy Truck Traffic        | 80                         |
| Business Office            | 70                         |
| Conversational Speech      | 60                         |
| Library                    | 50                         |
| Bedroom                    | 40                         |
| Secluded Woods             | 30                         |
| Whisper                    | 20                         |

Source: “A Guide to Noise Control in Minnesota,” Minnesota Pollution Control Agency, <http://www.pca.state.mn.us/programs/pubs/noise.pdf> and “Highway Traffic Noise,” FHWA, <http://www.fhwa.dot.gov/environment/htnoise.htm>.

Minnesota state noise standards have been established for daytime and nighttime periods. The MPCA defines daytime as 7:00 am to 10:00 pm and nighttime from 10:00 pm to 7:00 am. Daytime peak traffic volumes coincide with the morning and evening rush hours (typically 7:00 am to 8:00 am and 4:00 pm to 5:00 pm).

For residential land uses (identified as Noise Area Classification 1 or NAC-1), the Minnesota State standards for  $L_{10}$  are 65 dBA for daytime and 55 dBA for nighttime; the standards for  $L_{50}$  are 60 dBA for daytime and 50 dBA for nighttime. All receptors modeled in this analysis are classified as NAC-1. State noise standards are shown in Table 24-2.

**Table 24-2. Minnesota Noise Standards (all levels in dBA)**

| Noise Area Classification | Daytime<br>(7am to 10pm) |                 | Nighttime<br>(10pm to 7am) |                 |
|---------------------------|--------------------------|-----------------|----------------------------|-----------------|
|                           | L <sub>10</sub>          | L <sub>50</sub> | L <sub>10</sub>            | L <sub>50</sub> |
| NAC-1 (residential)       | 65                       | 60              | 55                         | 50              |
| NAC-2 (commercial)        | 70                       | 65              | 70                         | 65              |
| NAC-3 (industrial)        | 80                       | 75              | 80                         | 75              |

Minnesota Statute 116.07, Subd. 2a. states that municipal and county roads, except for roadways for which full control of access has been acquired, and for roads in the cities of Minneapolis and St. Paul, are exempt from State noise standards. Local (city and county) roadways considered with the project are exempt from State noise standards.

If federal funds are used for the construction of the CSAH 12 extension and interchange with US 14, federal noise criteria would apply when considering thresholds for consideration of noise abatement measures. This road and interchange was considered as part of the year 2025 noise analysis in the AUAR prepared for the Northeast Industrial Service Area (NEISA). For residential uses (Federal Land Use Category B), the Federal L10 standard is 70 dBA for both daytime and nighttime. Locations where noise levels are “approaching” (defined as being within one decibel of the criterion threshold, i.e., 69 dBA) or exceeding the criterion level, must be evaluated for noise abatement reasonableness. Federal Noise Abatement Criteria (NAC) are shown in Table 24-3; the standards are presented for comparison purposes only.

**Table 24-3. Federal Noise Abatement Criteria**

| FHWA Noise Abatement Criteria |                     |   |
|-------------------------------|---------------------|---|
| Category                      | L <sub>10</sub> dBA | Land Use                                |
| A                             | 60                  | Special areas requiring serenity        |
| B                             | 70                  | Residential and recreational areas      |
| C                             | 75                  | Commercial and industrial areas         |
| D                             | NA                  | Undeveloped areas                       |
| E                             | 55*                 | Residential, hospitals, libraries, etc. |

\*Applies to interior noise levels. All other land uses are exterior levels.

In addition to the identified noise criteria, the Federal Highway Administration (FHWA) also defines a noise impact as a “substantial increase” in the future noise levels over the existing noise levels. The Minnesota Department of Transportation (Mn/DOT) considers an increase of five dBA or greater a substantial noise level increase.

### Noise Level Monitoring

Noise level monitoring is commonly performed during a noise study to document existing noise levels. Existing noise levels can be used as a ‘baseline’ against which future scenarios are compared. In addition, when studying future noise levels projected with computer models, monitored noise levels for existing conditions are compared to modeled results for existing conditions to validate the computer modeling techniques and results.

Existing noise levels were monitored at two sites in the AUAR area (receptors R2 and R8; see Figure 1) chosen to represent areas of outdoor human activity (i.e., existing residential yards). Noise levels were monitored on October 19, 2006, between the hours of 6:00 am to 7:00 am (nighttime) and 8:00 am to 11:00 am (daytime). Monitored levels (L<sub>10</sub>) were within 2 dBA of modeled levels, as shown in Tables 24-4 and 24-5 below.

### Noise Modeling

Noise modeling was done using the noise prediction program “MINNOISE,” a version of the Federal Highway Administration (FHWA) noise model “STAMINA” adapted by Mn/DOT and approved by the MPCA. The model uses vehicle numbers, speed, class of vehicle, and the

typical characteristics of the roadway being analyzed. The computations for the proposed improvements were based on existing and projected traffic volumes, existing and proposed traffic speeds, and vehicle class percentages. The vehicle class percentages used for all roads were as follows: automobiles and light trucks, 97 percent; medium trucks, 2 percent; and heavy trucks, 1 percent. Noise modeling was completed using a “flat-earth model” to estimate noise levels as a worst-case scenario.

Traffic noise analyses are typically conducted for the peak noise hour during both daytime and nighttime. However, peak noise levels do not always correspond to peak traffic hours. This is the case when increased congestion during peak hours causes reduced speeds. Level of service (LOS) C conditions are considered to represent peak traffic noise conditions. The noise models for this analysis assumed all roadways operated at LOS C or better under peak hour existing conditions. For future No Build and Build conditions, the noise models assumed future improvements have been incorporated into the roadway network and that all roadways operated at level of service C or better under peak hour conditions.

Traffic noise was modeled at 10 locations within the AUAR area (see Figure 1 in Appendix E). Four of these 10 locations (receptors R1, R3, R4, and R5) represent proposed residential land uses with the AUAR area. Land use at these locations is currently agricultural. Receptor R1 represents a proposed residential land use adjacent to TH 22, an existing high volume roadway. Receptors R3, R4, and R5 represent locations within the AUAR area adjacent to future roadways (CSAH 12; Bassett Drive; Hoffman Road) constructed with the AUAR development.

Noise monitoring and modeling results for existing (year 2006) conditions and No Build and Build daytime traffic noise conditions are presented in Table 24-4. Nighttime peak noise levels are shown in Table 24-5.

#### **Summary of Traffic Noise Modeling Results**

- Existing (2006) daytime noise levels range from 57 dBA to 67 dBA (L10). Existing nighttime (2006) noise levels range from 56 dBA to 66 dBA (L10).
- Increases in daytime traffic noise from existing (2006) to future (2030) No Build conditions range from 0 to 3 dBA (L10). Increases in nighttime traffic noise from existing (2006) to future (2030) No Build conditions range from 0 to 4 dBA (L10). The greater increases in nighttime noise levels at Receptors R7 and R8 (4 dBA [L10]) are due to increased traffic along CR 86.

**Table 24-4. Noise Monitoring and Modeling Results—Daytime**

| Receptor               | Monitored       |                 | Existing<br>(year 2006) |                 | No-Build<br>(year 2030) |                 | Build<br>(year 2030) |                 |
|------------------------|-----------------|-----------------|-------------------------|-----------------|-------------------------|-----------------|----------------------|-----------------|
|                        | L <sub>10</sub> | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>      | L <sub>50</sub> |
| R1 <sup>1</sup>        |                 |                 | --                      | --              | --                      | --              | <b>72</b>            | <b>66</b>       |
| R2                     | <b>66</b>       | 57              | <b>67</b>               | 58              | <b>69</b>               | 60              | <b>72</b>            | <b>65</b>       |
| R3 <sup>2</sup>        |                 |                 | --                      | --              | --                      | --              | <b>70</b>            | <b>63</b>       |
| R4 <sup>2</sup>        |                 |                 | --                      | --              | --                      | --              | 65                   | 57              |
| R5 <sup>2</sup>        |                 |                 | --                      | --              | --                      | --              | 65                   | 57              |
| R6                     |                 |                 | 57                      | 50              | 57                      | 50              | 59                   | 53              |
| R7                     |                 |                 | 65                      | 55              | <b>68</b>               | 59              | <b>69</b>            | 60              |
| R8                     | <b>66</b>       | 48              | 65                      | 55              | <b>68</b>               | 59              | <b>69</b>            | 60              |
| R9                     |                 |                 | 60                      | 52              | 60                      | 52              | 62                   | 55              |
| R10                    |                 |                 | 62                      | 58              | 65                      | <b>61</b>       | <b>66</b>            | <b>62</b>       |
| <b>State Standards</b> | <b>65</b>       | <b>60</b>       | <b>65</b>               | <b>60</b>       | <b>65</b>               | <b>60</b>       | <b>65</b>            | <b>60</b>       |

**Bold numbers exceed State noise standards.**

<sup>1</sup>Receptor R1 represents a proposed residential land use within the AUAR area and was modeled only under Build conditions. Receptor R1 is located in an undeveloped area adjacent to TH 22.

<sup>2</sup>Receptors R3, R4, and R5 represent proposed residential land uses with the AUAR area and were modeled only under Build conditions. These areas are currently undeveloped and were assumed to

remain undeveloped under future No Build conditions.

**Table 24-5. Noise Monitoring and Modeling Results—Nighttime**

| Receptor               | Monitored       |                 | Existing<br>(year 2006) |                 | No-Build<br>(year 2030) |                 | Build<br>(year 2030) |                 |
|------------------------|-----------------|-----------------|-------------------------|-----------------|-------------------------|-----------------|----------------------|-----------------|
|                        | L <sub>10</sub> | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>      | L <sub>50</sub> |
| R1 <sup>(1)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>71</b>            | <b>65</b>       |
| R2                     | <b>67</b>       | <b>60</b>       | <b>66</b>               | <b>57</b>       | <b>68</b>               | <b>59</b>       | <b>72</b>            | <b>64</b>       |
| R3 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>70</b>            | <b>62</b>       |
| R4 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>64</b>            | <b>56</b>       |
| R5 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>65</b>            | <b>56</b>       |
| R6                     |                 |                 | <b>56</b>               | 49              | <b>57</b>               | 49              | <b>58</b>            | <b>52</b>       |
| R7                     |                 |                 | <b>64</b>               | <b>54</b>       | <b>68</b>               | <b>59</b>       | <b>68</b>            | <b>59</b>       |
| R8                     | <b>66</b>       | <b>50</b>       | <b>64</b>               | <b>54</b>       | <b>68</b>               | <b>59</b>       | <b>68</b>            | <b>59</b>       |
| R9                     |                 |                 | <b>59</b>               | <b>51</b>       | <b>59</b>               | <b>51</b>       | <b>61</b>            | <b>54</b>       |
| R10                    |                 |                 | <b>62</b>               | <b>57</b>       | <b>64</b>               | <b>60</b>       | <b>65</b>            | <b>62</b>       |
| <b>State Standards</b> | <b>55</b>       | <b>50</b>       | <b>55</b>               | <b>50</b>       | <b>55</b>               | <b>50</b>       | <b>55</b>            | <b>50</b>       |

**Bold numbers exceed State noise standards.**

<sup>1</sup>Receptor R1 represents a proposed residential land use within the AUAR area and was modeled only under Build conditions. Receptor R1 is located in an undeveloped area adjacent to TH 22.

<sup>2</sup>Receptors R3, R4, and R5 represent proposed residential land uses with the AUAR area and were modeled only under Build conditions. These areas are currently undeveloped and were assumed to remain undeveloped under future No Build conditions.

- Increases in traffic noise between year 2030 No Build and year 2030 Build conditions range from 1 to 3 dBA for daytime levels, and range from 0 to 4 dBA for nighttime levels. A 3 dBA increase in noise is the human threshold of perceptible changes in sound. Differences in exterior noise levels would be barely perceptible to residents at Receptor R2, and would be imperceptible to non-existent to residents at the other modeled receptor locations.
- Noise levels (L10) at Receptor R2 currently exceed State daytime noise standards for NAC-1 receptors, and would continue to do so under both future No Build and Build conditions. Receptors R7 and R8 do not currently exceed State daytime noise standards (L10), but would do so under both future No Build and Build conditions. Receptor R10 would exceed State daytime noise standards under Build conditions only.
- Nighttime noise standards are currently exceeded at all modeled receptors; noise levels would exceed State nighttime noise standards with both the future No Build and Build scenarios. Violation of the more stringent nighttime standard is common because the “nighttime” period includes the 6:00 am to 7:00 am period, which is the beginning of the morning rush hour.
- Future noise levels at proposed residential land uses in the AUAR area under the modeled Build scenario are anticipated to meet or exceed State daytime and nighttime noise standards at receptor locations adjacent to existing and future roadways.

## Conclusions

As previously stated, it takes a doubling of traffic volumes to result in a barely perceptible (3 dBA) increase in noise. For most modeled receptors, traffic volumes will increase under both No Build and Build conditions; however, this increase in traffic volumes would result in an increase in noise levels of less than 3 dBA and would be imperceptible to residents at these locations.

Traffic increases on TH 83 between No Build and Build conditions near Receptor R2 are anticipated to result in noise increases of 3 and 4 dBA (L<sub>10</sub>) for daytime and nighttime noise levels, respectively. Under the worst-case Build scenario modeled as part of this analysis, traffic volumes are anticipated to more than double on TH 83 over No Build volumes during the peak hours. Consequently, the difference in noise levels between future No Build and

Build conditions would be approaching the threshold of a perceptible (5 dBA) increase in noise at this location.

Future traffic noise levels at proposed residential land uses within the AUAR area are anticipated to meet or exceed State daytime and nighttime noise levels. These receptors were located immediately adjacent to the future roadways in the AUAR area. In order for the proposed land uses at these locations to avoid exceeding State noise standards, it is recommended that future residential areas consider site plan elements to reduce noise levels. Examples of site plan elements that could reduce noise on residential developments include berms, fencing, vegetative screening, and increased setbacks. An example of land use elements that could reduce noise on residential developments is commercial land uses directly adjoining the roadway, with residential land uses behind the commercial uses. Commercial buildings directly adjoining the roadway would block some traffic noise for residential receptors, as well as increasing the distance between the roadway and residences, and result in levels meeting State standards at areas closer to the roadway.

## 25. Nearby resources.

Are any of the following resources on or in proximity to the site?

Archaeological, historical or architectural resources? ☒ Yes ☐ No

Prime or unique farmlands or land within an agricultural preserve? ☒ Yes ☐ No

Designated parks, recreation areas or trails? ☒ Yes ☐ No

Scenic views and vistas? ☐ Yes ☒ No

Other unique resources? ☐ Yes ☒ No

If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

**Sensitive resources: Archeological, historic, and architectural resources.** For an AUAR, contact with the State Historic Preservation Office is required to determine whether there are areas of potential impacts to these resources. If any exist, an appropriate site survey of high probability areas is needed to address the issue in more detail. The mitigation plan must include mitigation for any impacts identified. Prime or unique farmlands. The extent of conversion of existing farmlands anticipated in the AUAR should be described. If any farmland will be preserved by special protection programs, this should be discussed. Designated parks, recreation areas, or trails. If development of the AUAR will interfere or change the use of any existing such resource, this should be described in the AUAR. The RGU may also want to discuss under this item any proposed parks, recreation areas, or trails to be developed in conjunction with development of the AUAR area. Scenic views and vistas. Any impacts on such resources present in the AUAR should be addressed. This would include both direct physical impacts and impacts on visual quality or integrity. "EAW Guidelines: contains a list of possible scenic resources (page 20).

### Historic/Archaeological/Architectural Resources

Information was received from the Minnesota Historical Society Preservation Office (SHPO) (See Appendix C—State Historical Preservation Correspondence). A search was completed of the MN SHPO Architecture/History Database and the Archaeological Database. This information indicated the AUAR area is in proximity to two archaeological sites. These include a site named Bartsch located in the South-South-Northeast quarter of section 21, Mankato township and is listed as an 'LS', which means lithic scatter, or flakes or stone tools were found. The second site is listed as Dickerson/White Star and is located in the southeast quarter of section 22, Mankato township and is listed as an 'HD', which means historic documentation. There are four sites listed on the History/Architecture Inventory. These sites are listed as 'Lincoln Park Historic District' which is listed in section 13, Mankato Township and is not in direct location to the AUAR area. The three other listings include 'farmhouse' which is listed in the NE-NE-NE quarter of section 10, Mankato Township, 'Schueuer Farmstead' off Co. Hwy 3 in the SW-NE-NW quarter of Section 11, Mankato township, and 'District School No. 55' located in the NW-NW-N quarter of section 11, Mankato Township.

It appears only one of the sites listed (Bartsch) may actually be in or directly adjacent to the project area. As development occurs near the area, or any other potentially sensitive area,

further identification and possibly additional research and/or analysis will be needed to determine the significance of archaeological sites in the project area.

The result of the SHPO database searched does not include an assessment for archaeological site potential, or provide a listing of all potential historic architectural properties. It represents only known and recorded archaeological sites and historic architectural properties from the current SHPO databases that may be historically significant. However, it is unknown whether these resources are architecturally/historically significant today because of possible alterations to the structure, reconstruction or demolition of significant resources, or from degrading over time which would decrease the historical significance of a property. Since the majority of archaeological sites in the state and many historic architectural properties have not been recorded, important sites or structures may exist within the AUAR area and may be affected by development projects within that area. Additional research, including field survey, may be necessary to adequately assess the area's potential to contain historic properties.

### **Prime Farmland**

Approximately 10% of the site is considered prime farmland soils according to the Natural Resources Conservation Service (see Exhibit I—Soil Classifications & Features Map). The site is not considered part of an agricultural preserve nor is it considered unique farmland. The NRCS defines prime farmlands as:

*“Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. These soils have the quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.”*

The majority of the site is considered prime farmland if drained or non-prime farmland. No farmland preservation measures have been considered. Since the majority of the site is not considered prime farmland and portions of the site are forecasted for development; no clear alternatives to conversion of farmland have been identified. The current Land Use Plan is intended to guide growth through thoughtful, planned development of the City. Through the Land Use Plan the City created, a growth area was defined outside of the current city limits based on the ability to service future growth. The purpose of this plan is to encourage planned, compact, contiguous development that efficiently uses land and the existing and proposed infrastructure. The Land Use Plan outlines agricultural preservation areas and defining boundaries for future growth. This plan also helps protect the outlying agricultural/rural areas from unplanned, scattered urban growth. Blue Earth County also has controls to promote development where it can be sustained with public infrastructure services. This, in turn, protects the environment and deters fragmentation of agricultural areas by non-agricultural land uses.

Rural areas and agricultural practices are important, not only to the character of the area, but to the vitality of the economy. It is in the City's best interest to take reasonable steps to ensure the rural and agricultural quality of life, while also trying to take a responsible approach to urban development. In consideration of growth projections and land-use goals, the project is consistent with the Comprehensive Plan.

In 1999 the County adopted a “Right to Farm” ordinance and implemented an agricultural zone disclosure statement to be signed by non-farm developers. This disclosure form becomes a part of each parcel's official file. Setback standards are included in the agricultural district performance standard section. The AUAR area is within the County's



Urban Service Overlay District which requires any development contained within the district be connected to urban utilities.

### **Parks, Recreational Areas, Trails**

There are no existing parks, recreation areas, or trails within the AUAR area; however, this project has the potential to connect many of the adjoining area trail and park systems.

The Sakatah Singing Hills State Trail is within the vicinity of the AUAR area to the north. According to the Minnesota Department of Natural Resources, the trail is a 39-mile multiple use paved trail from Mankato to Faribault which has been developed on an abandoned railroad grade. The trail lies in the transition zone between what was once the Big Woods and the vast prairies. The trail has been developed for bicycling, hiking, in-line skating, horseback riding, skiing, and snowmobiling. It begins at Lime Valley Road near Mankato and ends east of Interstate 35 at Faribault.

The City of Eagle Lake also has a local trail that is located within the vicinity of the AUAR area to the east. This trail runs west from the Eagle Lake city limits along US Hwy 14, out to the railroad tracks where it crosses underneath US Hwy 14 and connects up with the Sakatah Trail to the north.

The City of Mankato has a system of local trails within the current city limits to the west. An unnamed trail is located to the west of the AUAR area along the west side of TH 22 that goes from Hoffman Road north past US Hwy 14 to the Sakatah Trail.

In the City of Mankato's Parks & Open Space Plan (2002), one of the guiding principles is to 'Preserve the Natural and Cultural Character' of the area. Rivers, bluffs, ravines, woods, and prairie are natural features in and around Mankato that are important character elements that add to the liveability of the place. Natural areas need to be identified and protected from effects of development. Establishing parks, greenways, and scenic easements within existing natural areas can provide tools for preservation. Controlling the level of recreational use and its effects on the natural resources is necessary to avoid environmental damage. Historic cultural resources also add to the character and pride of the Mankato community.

Another guiding principle listed in the Plan includes 'Weave it Together' in which the parks are woven into the fabric of the community, blending the built and the natural environments. Parks, trails, and natural corridors connect, preserve, and provide safe and pleasant routes to parks, neighborhoods, schools, and commercial districts.

There are designated parks and open spaces located within the AUAR area. According to the map titled 'Park & Open Space Plan' in the City of Mankato's Park & Open Space Master Plan, the AUAR area is in need of a future community park.

### **Mitigation**

As part of the mitigation plan, portions of the AUAR area will be utilizing and set aside for a regional community park. During stormwater planning, all opportunities to provide stormwater facilities along park corridors will be identified. The Sakatah Trail also has the potential to be re-routed to help the access problems in the area. A Parks and Open Space Plan has been developed (Appendix H) which addresses the park and recreational needs and open space preservation efforts and greenway connections of the project area. The City will reserve land within the project area for recreational and open space opportunities prior to development.

## **26. Visual impacts.**

Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? \_Yes ☒ No

If yes, explain.

**Adverse visual impacts.** *If any non-routine visual impacts would occur from the anticipated development, this should be discussed here along with appropriate mitigation.*

This project will not create adverse visual impacts from non-routine development.

**27. Compatibility with plans and land use regulations.**

Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency?

☒ Yes ☐ No. If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

**Compatibility with Plans.** *The AUAR must include a statement of certification from the RGU that its comprehensive plan complies with the requirements set out at 4410.3610, subpart 1. The AUAR document should discuss the proposed AUAR area development in the context of the comprehensive plan. If this has not been done as part of the responses to items 6,9,18,21, and others, it must be addressed here; a brief synopsis should be presented here if the material has been presented in detail under other items. Necessary amendments to comprehensive plan elements to allow for any of the development scenarios should be noted. If there are any management plans of any other local, state, or federal agencies applicable to the AUAR area, the document must discuss the compatibility of the plan with the various development scenarios studied, with emphasis on any incompatible elements.*

A resolution was signed by the Mankato City Council (see Appendix A—Resolution to initiate the AUAR process) stating the land use scenarios for the AUAR area depict anticipated development for the area. This resolution also certifies that the City has a Comprehensive Plan required by MN Rules 4410.3610, subpart 1, which includes:

- A. A land use plan designating the existing and proposed location, intensity, and extent of use of land and water for residential, commercial, industrial, agricultural, and other public and private purposes.
- B. A public facilities plan describing the character, location, timing, sequence, function, use, and capacity of existing and future public facilities of the local governmental unit. The public facilities plan must include at least the following parts:
  - (1) a transportation plan describing designating, and scheduling the location, extent, function, and capacity of existing and proposed local public and private transportation facilities and services; and
  - (2) a sewage collection system policy plan describing, designating, and scheduling the areas to be served by the public system, and the standards and conditions under which the installation of private sewage treatment systems will be permitted.
- C. An implementation program describing public programs, fiscal devices, and other actions to be undertaken to implement the comprehensive plan. The implementation plan must include a description of official controls addressing the matters of zoning, subdivision, and private sewage treatment systems, a schedule for the implementation of those controls, and a capital improvements program for public facilities.

Future Land Use Scenario A (See Exhibit E-1—Scenario A. Future Land Use Map) is compatible with the City of Mankato's Comprehensive Plan. This scenario shows the projected land uses as described in the current Mankato Land Use Plan Map and the Mankato Area Transportation and Planning Study (MATAPS). Land Use Scenario B (See Exhibit E-2—Scenario B. Future Land Use Map) includes mixed-use land designations and higher densities than Scenario A. Scenario C (See Exhibit E-3—Scenario C Future Land Use Map) expands on the mixed-use of Scenario B by increasing the land use densities and focusing densities around nodes and alternative forms of transportation.

This plan is also consistent with Blue Earth County's Comprehensive Plan. This project will also comply with the Orderly Annexation Agreement with Mankato Township and a joint resolution for annexation from Mankato Township into the City of Mankato will need to be

submitted.

Blue Earth County's goals for Urban Development states, "Urban growth pressure is being applied in many areas of Blue Earth County. It is in the best interest of the county to limit the development of uses that may eventually require the extension of urban utilities. The County supports orderly growth out from urban areas with urban utility services."

The AUAR area is currently located in Mankato Township. Individual areas within the AUAR area will be annexed prior to development within specific parcels. The Township has given the City of Mankato permission to act as the RGU for this project.

The Mankato Township Orderly Annexation Agreement was adopted on February 3, 1995 and is effective until 2015. The agreement is in place to manage an orderly growth process and prohibit new non-farm development (new residential subdivisions, commercial and industrial development) within the township. New development would have to be annexed into the City and serviced by municipal utilities. Property owners have to petition the City to annex their property and the City cannot force annexation of property into city limits.

According to the City of Mankato's Land Use Plan, this project is consistent with the City's projected land use (See Exhibit D—Existing Land Use Plan). The AUAR has also been completed in coordination with the City of Eagle Lake and references the Eagle Lake Land Use Plan. This project will also meet all City of Mankato zoning ordinances and long-range planning goals. Recommendations regarding land use, transportation, and park and open space will be followed during the design phases of development. Necessary amendments will be needed to the current comprehensive plan to allow development in accordance with any of the land use scenarios.

A planning study called the Mankato Area Transportation and Planning Study (MATAPS) was completed in 1996 (and updated in 2003) after the first studies were undertaken in the early 1970s by six governmental agencies: MnDOT, Blue Earth County, Nicollet County, the City of Mankato, the City of North Mankato, and the Region Nine Development Commission. This partnership provided a platform from which long-range regional and cumulative impacts, goals and policies were developed and planned for the cumulative impacts associated with the transportation system surrounding the City of Mankato. The AUAR addresses both direct and indirect transportation issues through the detailed traffic analysis completed by SRF Consulting.

The project has also considered and utilized the City of Mankato's Park and Open Space Plan to determine park locations and trail connections. This plan takes a cumulative approach and is used as a tool to provide recreational activities as well as preserve sensitive natural resources. The Plan helps the City to ensure that investments made to parks and open space in the future are part of a greater whole, a complex interrelated system of wetlands, woodlands, recreation fields, trails, playgrounds and parkways, connecting to each other. During the planning process for land uses within the AUAR, this plan was utilized for the locations of trails, parks, and open spaces within the AUAR area. In addition, Blue Earth County's Greenprint plan was also utilized to determine open space and natural resource connectivity through the County's 'greenprint corridors'. This initiative focuses on wetlands, water quality, flood control, fish and wildlife habitat, education, recreation, mineral deposits, and habitat fragmentation. In accordance with the Open Space Plan & the Greenprint Plan, the majority of natural areas within the AUAR area have been planned for park and open space and will provide habitat for area wildlife in order to decrease the cumulative impacts associated with the loss of these areas.

## **28. Impact on infrastructure and public services.**

Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project?

☒ Yes    ☐ No. If yes, describe the new or additional infrastructure or services needed. (Note: any

infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

**Impact on infrastructure and public services.** *This item should first of all summarize information on physical infrastructure presented under items (such 6, 17, 18 and 21). Other major infrastructure or public services not covered under other items should be discussed as well — this includes major social services such as schools, police, fire, etc. The RGU must be careful to include project-associated infrastructure as an explicit part of the AUAR review if it is to exempt from project-specific review in the future.*

Based on the 2005 Minnesota State Demographer's population projections, the City of Mankato has an estimated population of 35,031 persons for 2005 with an average of 2.31 persons per household. The proposed land use under Scenario C will add approximately 5,981 housing units, which would add approximately 13,817 persons to the City. This would result in a substantial population increase of almost 40%, which will ultimately have a significant affect on the need for additional public services and infrastructure.

To accommodate development in the AUAR area, public and private infrastructure improvements will be constructed in association with development. The utilities to be extended to this area include sanitary sewer, water, storm drainage, telephone, electricity, natural gas, and potentially fiber optics, cable and other media lines. New road construction and existing road improvements will also be associated with development within the AUAR area. The new or expanded infrastructure will result in increased maintenance for the City and utility providers in the future.

Development within the AUAR area will utilize the City of Mankato's public water supply and wastewater treatment facilities. Infrastructure related to communications, electricity, and natural gas (dry utilities) will be provided through private companies.

### **Major Social Services**

A significant increase of public services will need to be provided to accommodate the development in the AUAR area. Among other things, there will be impacts to fire, police, and emergency safety. In addition, more staffing will ultimately be needed in many city departments due to the increased demands from development in the AUAR area. These demands include such things as maintenance of several miles of new public roadways, sidewalks and pedestrian trail systems, park areas, and police and emergency service. Public facilities such as fire, ambulance and police stations along with other government buildings are becoming strained, and will be impacted by the additional population that will be associated with the proposed development. Fire protection is a high priority public service for the proposed types of land uses. The City may need to construct a new fire station in the area to better provide fire protection.

Considering the size of the AUAR area, Future Land Use Scenario C has called out a portion of the area for a school facility. As stated earlier, full build-out of the AUAR area will considerably increase the population of the City of Mankato and as a result, local schools will be affected by the population growth. The increased population from development within the AUAR area will lead to an increase in school enrollment. District 77 has an average of .5 students per household within the district. If this average of .5 students per household were applied to the proposed land uses of Scenario C with approximately 5,981 housing units, school enrollment would increase by approximately 2,991 students. If evenly distributed, this would add approximately 230 students to each grade level (K-12).

School buildings within the district are nearing capacity and are expected to exceed capacity in some locations in the near future. The ISD# 77 school district has preliminarily approved of a school in this area in order to provide for future residents within the AUAR area and for current residents located to the west in the Hilltop area of Mankato. The District is currently in the process of conducting a Long Range Plan to determine future needs of the district. Funding to implement additional schools within the school district are currently dependant on approval of a referendum from the school district taxpayers.

## Road improvements

Road construction and improvements will occur as a result of development within the AUAR area. New internal road alignments have been determined for the future extension of Adams Street, Bassett Drive, Hoffman Road, and CSAH 12, as well as additional north-south and east-west connections (See Exhibit L—Area Transportation Plan). Additional roads will be necessary, but the exact layout and locations have not been determined.

### County State Aid Highway 12 Extension

CSAH 12 will eventually be extended through the AUAR area intersecting with CSAH 41 and continuing south. As part of the CSAH 12 extension project a new interchange at US 14 will be constructed in 2009. The construction of an additional interchange was part of the mitigation plan to accommodate the additional traffic for development within the NEISA AUAR and future development within the AUAR area.

## 29. Cumulative impacts.

Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement. Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative impacts. Describe the nature of the cumulative impacts and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to cumulative impacts (*or discuss each cumulative impact under appropriate item(s) elsewhere on this form*).

**Cumulative impacts.** *This item does not require a response for an AUAR with respect to cumulative impacts of potential developments within the AUAR boundaries, since the entire AUAR process is intended to deal with cumulative impacts from related developments within the AUAR area; it is presumed that the responses to all items on the EAW form encompass the impacts from all anticipated developments within the AUAR area. However, the questions of this item should be answered with respect to the cumulative impacts of development within the AUAR boundaries combined with past, present, and reasonably foreseeable future projects outside of the AUAR area, where such cumulative impacts may be potentially significant. (As stated on the EAW form, these cumulative impact descriptions may be provided as part of the responses to other appropriate EAW items, or in response to this item).*

This item does not require a response for an AUAR according to EQB guidelines since the entire AUAR process deals with cumulative impacts from related developments within the AUAR area. However, additional information on cumulative impacts of development within the AUAR boundaries combined with past, present, and reasonably foreseeable future projects outside of the AUAR area have been outlined in this section.

One area this AUAR does not address deals with the cumulative effects associated with sprawl and suburbanization. This can have both positive and negative cumulative effects socially and environmentally. Determining the full effect of cumulative impact is more intuitive than quantifiable. Some of the cumulative effects that can be observed from development within the AUAR area are loss of agricultural land, loss of open space, fragmentation of wildlife habitat, and loss of a rural sense of place.

There is a competing issue with the goals of many communities in balancing development with agricultural needs, open space, and natural resources while trying to retain a sense of place. Sprawl has become an issue in many areas, and is only becoming a larger issue because of the need to preserve natural areas and open space. Through these competing issues, many environmental resources, former open spaces and farmland have decreased and infrastructure costs of roads and sewer system extensions have increased. As part of this AUAR process, the city of Mankato has added a master-planning component to examine strategic locations for urban service nodes, park interconnections, walk-ability, open space preservation opportunities, transit connections, and alternative stormwater design standards in order to combat the issues generally associated with sprawl. The Planning Principles & Urban Design Alternatives (Appendix G) developed for the project area provides a greater definition of the intent for the project area and provides details expressing the character and quality of the area to be pursued during development. The

focus of this document outlines a conceptual framework to guide future development within the project area. The key principles outlined include: Natural Resources Conservation and Enhancement, Mixed Land Use and Gateway Nodes, Connectivity and Multi-Modal Transportation, Alternative Stormwater Management, and Regional Connectivity and Preservation.

The City understands how important rural areas and agricultural practices are, not only to the character of the area, but to the vitality of our economy. The City is trying to take reasonable steps to ensure the rural and agricultural quality of life and to preserve agricultural land, open space and wildlife habitat while also trying to take a responsible approach to urban development. In consideration of the City's growth projections and land-use goals, the project is consistent with the Comprehensive Plan. Blue Earth County also has controls to promote development where it can be sustained with public infrastructure services. This, in turn, protects the environment and deters fragmentation of agricultural areas by non-agricultural land uses.

The City of Mankato is a very proactive community in terms of cumulative impacts in comparison to surrounding towns and other similar-sized cities in the state. The City of Mankato is a regional hub for most of the south and south-central portions of Minnesota. Mankato has experienced significant growth since the town was established, especially through the 1970s. Mankato has used a proactive approach to development in order to decrease the negative cumulative effects to the environment and population of the area which can stem from a reactive approach to infrastructure planning and development. The City of Mankato and the surrounding townships (Lime, South Bend, and Mankato) have approved orderly annexation agreements to work together and have a common understanding for orderly growth. The City has also developed numerous planning documents to address growth, design, and connectivity. These include: the Mankato Area Transportation and Planning Study (MATAPS), a Park and Open Space Plan, Urban Design Guidelines, and Capital Improvement Plans.

### **Transportation Impacts**

Consideration of direct, indirect, and cumulative impacts (or effects) of development is important considering the increase in traffic and public transportation infrastructure. While direct impacts are easier to identify, indirect and cumulative impacts are more difficult. Direct impacts are caused by the action and occur at the same time and place as a specific project. Indirect impacts are associated with a project and occur later in time or further removed in distance; but they are still reasonably foreseeable such as induced land development from highway projects. Cumulative impacts, on the other hand, result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions, regardless of the agency or person initiating the other actions. Where indirect impacts are specifically related to a transportation project and can occur from induced development, cumulative impacts are the result of other present and future development actions.

The City of Mankato has taken many steps to plan for the cumulative impacts associated with the transportation system. A planning study called the Mankato Area Transportation and Planning Study (MATAPS) was completed in 1996 (and updated in 2003) after the first studies were undertaken in the early 1970s by six governmental agencies: MnDOT, Blue Earth County, Nicollet County, the City of Mankato, the City of North Mankato, and the Region Nine Development Commission. This partnership provided a platform from which long-range regional and cumulative impacts, goals and policies were developed. Further, the AUAR addresses both direct and indirect transportation issues through a detailed air, noise and traffic analysis completed.

To address additional cumulative impacts related to transportation and traffic, the need of an AUAR for the project is the cumulative result of upgrades to US Hwy 14 occurring from Nicollet to Rochester. US Hwy 14 is in the process of becoming a 4-lane road, and has

seen an increase in traffic over recent years. The improvements to the Hwy 14 transportation system has appealed to industrial, commercial, and manufacturing business utilizing the roadway system. The vicinity around the AUAR area has seen development as a result of these improvements. The City of Mankato is using the AUAR process to gain a better understanding of the environmental impacts associated with the cumulative effects of growth in the area.

### **Open Space/Cover Types/Corridors Impacts**

The City of Mankato created a Parks & Open Space Plan in September 2002. This plan takes a cumulative approach and is used as a tool to provide recreational activities as well as preserve sensitive natural resources. The Plan helps the City to ensure that investments made to parks and open space in the future are part of a greater whole, a complex interrelated system of wetlands, woodlands, recreation fields, trails, playgrounds and parkways, connecting to each other.

In accordance with the Open Space Plan and as stated in the AUAR, the majority of natural areas will remain intact and will provide habitat for area wildlife in order to decrease the cumulative impacts associated with the loss of these areas. A Parks and Open Space Plan (Appendix H) has been developed to address the park and recreational needs and also the open space preservation efforts and greenway connections for the project area.

The Blue Earth County Greenprint Program is another initiative that, when finished, will help preserve natural resources throughout Blue Earth County. It is intended to bring natural resources to the forefront for planning and decision making. The County's Greenprint plan has identified 'Greenprint' areas (See Exhibit H—Existing Conditions Map) which are defined as existing natural connections in the landscape that facilitate movement of plants and animals between larger patches of habitat. Through this initiative, the County is focusing on wetlands, water quality, flood control, fish and wildlife habitat, education, recreation, mineral deposits, and habitat fragmentation.

### **Ground Water Impacts**

Over pumping of the water supply system can cause decline of ground water levels in aquifers, local impacts on streams and wetlands, and results in the potential unavailability of necessary groundwater resources for future use. Long-term effects of over-pumping groundwater may include depletion of wetlands, streams, springs, and lakes, as well as ecological or other changes.

In order to create a sustainable system of water supply for Mankato, a dynamic equilibrium is sought that approximately balances recharge, discharge, and withdrawals of groundwater.

The City of Mankato appropriates water from a combination of sources. One source includes multiple wells constructed into the Mt. Simon Hinckley Aquifer, and the second source is a Ranney vertical caisson with horizontal collector lateral. Mt Simon-Hinckley Aquifer is the deepest aquifer in the area and has limited recharge. This aquifer is protected for potable water purposes and restricts new uses. New uses are only allowed if there are no other alternatives and when conservation measures are being implemented. The City of Mankato recently improved their water supply system with the addition of two new wells. Because of the protections to this aquifer, the City of Mankato found alternative sources of water and drilled two wells into the Ranney vertical caisson with horizontal collector laterals instead of a well into the Mt. Simon-Hinckley Aquifer.

Horizontal wells are constructed by installing a vertical caisson into the ground, then pushing horizontal collector laterals out from the bottom of the caisson. In this type of well, the materials above the collector laterals remain undisturbed. Ranney Collectors are one type of horizontal well. Because they are typically shallow and located close to a surface water body with the intent of capturing water in alluvial aquifers, they are also considered a

source of groundwater at risk from contamination by relatively large waterborne pathogens passing to the ground water collector from surface water. What this means is marginal water is utilized by the City for water supply by utilizing the facilities at the water treatment plant.

The City of Mankato has an ever-increasing need for water supply. In order to decrease negative cumulative impacts on surface and groundwater from general growth and population increases, the City expanded their horizontal collector lateral. Water from this source comes from horizontal collectors that run under the Minnesota River. The effects of growth and development on groundwater levels generally lag behind the growth or development activities. For instance, as land is converted to urban use with storm sewers and paved surfaces or as drainage is redirected from wetlands to ditches for increased agricultural production, the patterns of ground water recharge are altered or interrupted. This decreases the amount of water that infiltrates into the ground to replenish the aquifers. Wetland restoration and preservation is one management technique that can be used to reduce the redirection of precipitation and surface water runoff that might otherwise have recharged the groundwater. Safeguarding the natural recharge process in this manner can have a long-term positive influence on water supplies. This project and the City of Mankato has taken a planned approach to growth that considers the available water supply and water resource setting to minimize the impacts on both ground and surface water and human resources.

### **Sanitary Sewer Impacts**

In order to create a sustainable system for Mankato, a dynamic equilibrium is sought that approximately balances recharge, discharge, and withdrawals of groundwater.

The City of Mankato has considered the cumulative impacts of wastewater treatment and has completed extensive master planning. The Wastewater Treatment Plant recently received an upgrade that greatly enhanced the quality of water entering the Minnesota River (the water entering the river is actually cleaner than the water pumped from water supply facilities) and is designed for use through the year 2020.

As stated in the AUAR, the City of Mankato is in partnership with Calpine Corporation who constructed and is operating a new water reclamation facility adjacent to the City's existing WWTP. The effluent from the WWTP enters Calpine's facility for additional treatment before being routed to Calpine's Mankato Energy Center, a newly constructed power plant. Calpine will use the reclaimed water for processing and cooling. Calpine's facility has been designed to provide two additional stages of treatment to the wastewater. Surrounding cities, including Eagle Lake and the area around Lake Washington, are currently pumping their wastewater to the Mankato facilities, thereby decreasing the cumulative impacts of outlying areas by preventing less-treated wastewaters from entering waters of the State. Cumulatively, this helps protect habitat, wildlife, and human resources in the area, as well as downstream areas throughout the state.

In addition to eliminating the risk of pollution from the liquid portion of the wastewater treatment process, the city is currently studying the possibility of further processing of the biosolids generated in their wastewater treatment operations. Currently the wastewater treatment plant produces Class B biosolids. This material is approximately 22% solids and can only be disposed of by landfilling or land application to agricultural land. Further processing of the biosolids to Class A would entail dewatering to 95% solids and killing the pathogens, enabling the material to be used on golf courses, residential yards, essentially anywhere fertilizer would be used.

### **Stormwater Impacts**

The City of Mankato is located adjacent to the Minnesota River in Blue Earth County and can be divided into three main topographical regions. These regions are the floodplain of the Minnesota River, the steep bluff area, and the upland. The floodplain of the Minnesota



River is the area where much of the original development of Mankato occurred. Most of the bluff area which can be developed has been developed. The vast majority of this steep bluff area will remain as open area. The upland plain is the area where much of the present development is occurring, including the AUAR area. The City experienced rapid growth in the 1970s and 1980s as a result of the expansion of the state university facilities and because the City of Mankato has become a commercial hub for the south and south-central region of Minnesota. In the upper plain above the Minnesota River bluff where the AUAR area is located, the land is extremely flat and the natural drainage pattern in some locations is difficult to determine. The drainage patterns within and outside of the AUAR area eventually lead into the Minnesota River.

Minnesota's lakes, rivers, wetlands and streams all depend on the replenishing waters of annual precipitation. However, when rain falls on land and impervious areas such as paved streets, parking lots and building rooftops it can wash away soil and sediment. Stormwater runoff from these surfaces can change both water quality and quantity affecting our water resources physically, chemically and biologically. The stormwater from within and outside the AUAR area will increase potentially having a negative effect on downstream waters. An increase in runoff also has the potential to overwhelm existing water systems including ravines, creeks, and rivers, possibly leading to the destruction of habitat, erosion problems, downstream sediment deposits, and or an increase in nutrient levels.

The natural drainage patterns within the City of Mankato have already been disturbed by existing development. Existing storm drains, streets, road ditches, culverts, and other forms of urban development have made some diversions and concentrations of stormwater runoff. While most of this development has not had a serious adverse effect on the natural drainage pattern, the intensive development along the Minnesota River has created serious construction problems and increased the cost in providing adequate outlets for the major systems outside the AUAR area.

The City of Mankato has been very proactive in order to address cumulative impacts associated with stormwater and is currently updating its existing Stormwater Master Plan to include the mandated MS4 standards. The requirements of the Phase II MS4 program include: 1) Reduce the discharge of pollutants to the "maximum extent practicable", 2) Protect water quality; and 3) Satisfy the appropriate water quality requirements of the Clean Water Act. Minnesota regulates the disposal of stormwater through a combined NPDES/SPS permit and through the Municipal Separate Storm Sewer Systems (MS4s) program for applicable projects.

Mandated by Congress under the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) Stormwater Program is a comprehensive national program for addressing polluted stormwater runoff. Minnesota regulates the disposal of stormwater through State Disposal System (SDS) permits. The MPCA issues combined NPDES/SDS permits for construction sites, industrial facilities and municipal separate storm sewer systems (MS4s).

As stated earlier, the Minnesota Pollution Control Agency (MPCA) is in charge of reducing the pollution and damage caused by stormwater runoff. This designation was mandated by Congress under the Clean Water Act because of the pollution and damage caused by stormwater runoff. In 1990, the EPA promulgated rules establishing Phase I of the NPDES stormwater program. This program included regulations for MS4s to implement a stormwater management program to control polluted discharges. The Phase II rule extends coverage of this program to smaller municipalities and businesses and includes the City of Mankato.

Stormwater and drainage plans for cumulative impacts and master planning have been prepared for the City since the 1970s. According the Drainage Study prepared by Barr

Engineering (1994) one concern in the preparation of all stormwater systems is to protect and preserve the existing ravines and creek valleys located within the City. Many alternatives are considered to provide protection to these ravines. One method provides storage in the upland areas in order to decrease flowrates, in other areas, diversions are made from one drainage area to another to decrease flowrates into the ravines, and a third method collects the stormwater from numerous small systems and outlets it at a single location where it is more economically feasible to provide the energy dissipation necessary to protect the ravines and creek valleys.

In addition, the City of Mankato has a Strategic Plan which is updated biannually and is used for planning and lays the framework for future development while identifying cumulative impacts. Overall, the City of Mankato is committed to seeking ways to improve and better manage stormwater runoff in an effort to improve the quality of water going into the Minnesota River and to reduce negative cumulative impacts associated with runoff. To do this, the City closely monitors stormwater facilities to ensure they meet acceptable water quality standards. The City also has a strategy to keep citizens educated and informed about water quality issues, among numerous other planning and design activities to ensure the quality of water going into the River.

The stormwater treatment facilities will be designed to reduce peak flow rates from existing conditions to pre-development conditions and reduce sedimentation, thus increasing the quality of water draining from the AUAR area. Stormwater management facilities will be constructed throughout the AUAR area to mitigate the impacts on receiving waters from development. These facilities will be designed and constructed on both a regional and site specific basis. To ensure that stormwater impacts are mitigated, it is proposed that these facilities include a variety of stormwater management methods. These methods will consist of traditional stormwater detention ponds, constructed wetlands, vegetative and media filtration, and other site-specific stormwater treatment methods.

With respect to stormwater management, the Minnesota Stormwater Manual was used extensively for potential BMP selection and design. The City plans to incorporate innovative Best Management Practices (BMP) into the overall stormwater management strategy for the AUAR area around the key concept of Low Impact Design. The traditional method for treatment of stormwater runoff is with stormwater detention basins. These basins will still be a necessary tool for regional stormwater management in this area for rate control and flood storage. However, other less traditional methods will also be employed. These include the use of bio-retention, (things such as native landscaping and constructed wetlands) filtration, (vegetated swales, pervious pavement with underdrain system) and treatment structures (for sediment removal). These practices can be used in such a way as to be unobtrusive, or even attractive in the urban landscape. Stormwater treatment areas will remove sediment from the stormwater, enhance the quality of runoff off-site and outside the AUAR boundary, and will provide open space area for wildlife species. Regional stormwater areas will also be utilized for further treatment to remove sediment. In addition, Barr Engineering is currently in cooperation with the City and is designing another large regional stormwater treatment area in order to treat stormwater before entering the Minnesota River. Utilizing numerous treatment facilities helps prevent negative cumulative effects to the local population, the Minnesota River, local and regional habitat and wildlife, and downstream amenities.

Additional plans for stormwater include exploring the use of stormwater detention ponds as a source of irrigation water. This would not only reduces the demand on the city's water supply and distribution system, but would reduce the stormwater volume that would otherwise be discharge to receiving waters.

### **30. Other potential environmental impacts.**

If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss

them here, along with any proposed mitigation.

**Other potential environmental impacts.** *If applicable, this item should be answered as requested by the EAW form.*

This project is not believed to cause any anticipated adverse environmental impacts not addressed in this AUAR.

### 31. Summary of issues.

*Do not complete this section if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document, which must accompany the EAW. List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.*

**Summary of Issues.** *The RGU may answer this question as asked by the form, or instead may choose to provide an Executive Summary to the document that basically covers the same information. Either way, the major emphasis should be on: potentially significant impacts, the differences in impacts between major development scenarios, and the proposed mitigation.*

The City of Mankato chose to order a substitute form of environmental review, this AUAR, for the Greater East Mankato Infill Service District area. As a result, future projects in the AUAR area may not require separate environmental review if, 1) they are consistent with the original assumptions made in this review, 2) if their impacts do not exceed those anticipated by the AUAR, and 3) if the mitigation measures are implemented as required for within this AUAR.

A summary of issues has been included as part of the Draft Mitigation Plan. The major emphasis in this summary and mitigation plan is on potentially significant impacts and the differences in impacts between the major development scenarios. The summary of issues and the proposed mitigation plan can be found in the Draft Mitigation Plan section on the following pages.

**RGU CERTIFICATION.** The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.

**Certification by the RGU.** *In an AUAR document, no certifications as listed at the end of the EAW form are necessary. (The RGU is legally responsible for the accuracy and completeness of the document and for properly distributing it nonetheless.)*

**Mitigation Plan.** *The final AUAR document must include an explicit mitigation plan. At the RGU's option, a draft plan may be include in the draft AUAR document; of course, whether or not there is a separate item for a draft mitigation plan, proposed mitigation must be addressed through the document.*

*It must be understood that the mitigation plan in the final document takes on the nature of a commitment by the RGU to prevent potentially significant impacts from occurring from specific projects. It is more than just a list of ways to reduce impacts—it must include information about how the mitigation will be applied and assurance that it will. Otherwise, the AUAR may not be adequate and/or specific projects may lose their exemption from the individual review.*

*The RGU's final action on the AUAR must specifically adopt the mitigation plan; therefore, the plan has a "political" as well as a technical dimension.*

**Response to comments on the draft AUAR document.** *The final AUAR document must include a section specifically responding to each timely and substantive comment on the draft that indicates the way in which the comment has been addressed. Similar comments may be combined for purposes of responding.*

## MITIGATION PLAN & IMPLEMENTATION

**Mitigation Plan.** *The final AUAR document must include an explicit mitigation plan. At the RGU's option, a draft plan may be included in the draft AUAR document; of course, whether or not there is a separate item for a draft mitigation plan, proposed mitigation must be addressed through the document.*

*It must be understood that the mitigation plan in the final document takes on the nature of a commitment by the RGU to prevent potentially significant impacts from occurring from specific projects. It is more than just a list of ways to reduce impacts—it must include information about how the mitigation will be applied and assurance that it will. Otherwise, the AUAR may not be adequate and/or specific projects may lose their exemption from the individual review.*

*The RGU's final action on the AUAR must specifically adopt the mitigation plan; therefore, the plan has a "political" as well as a technical dimension.*

This Mitigation Plan is submitted as part of the AUAR process to provide a summary of perceived issues and a general outline of intended measures considered necessary to mitigate impacts from the project.

The final mitigation plan was further developed after reviewers provided comments and input. This Plan will provide the City staff, other government regulators, and prospective tenants or purchasers of land with an understanding of the actions necessary to protect the environment and limit impacts by development in the AUAR area.

The primary mechanism for mitigation of environmental impacts is the effective use of existing codes, rules, and regulations. The enforcement options available and the general mitigation measures include:

- Execution of a developer(s) agreement(s) under the City of Mankato's ordinance.
- Approval of a development that includes specific requirements including performance standards, design guidelines and phasing.
- Enforcement of the permitting requirements of all applicable local, state and federal agencies
- Requirement that a performance bond be submitted

The following section outlines the mitigation measures proposed for the anticipated environmental impacts as a result of the continued development and redevelopment of the project area. The issue area is listed, followed by a description of the issue, and finally the plan to address the issue is listed, whether the mitigation is already in place, or proposed.

### **SUMMARY OF ISSUES**

#### **I. Project Magnitude**

A). Increased population of 40% from 35,031 (2005 estimate) to 48,789 (approximately 13,817 population increase), increased school enrollment.

- 1) Utilize the Planning Principles & Urban Design Alternatives developed through this AUAR process to address growth in the project area.
- 2) The ISD 77 is currently in the process of conducting a Long Range Plan to determine future needs of the district.

B). Sprawl

- 1) Incorporate higher densities and multi-use nodes.
- 2) Continue to work with the surrounding township and adhering to orderly annexation agreements to restrict development to the municipal areas. This will restrict unorganized sprawling development and the fragmenting of natural areas and agriculture on a larger scale.
- 3) Utilize the Urban Design Guidelines currently in place and further develop those guidelines to include the project area.

## **2. Cover type**

### **A). Conversion of agricultural land & natural areas**

- 1) Continue to work with the surrounding township and adhering to orderly annexation agreements to restrict development to the municipal areas. This will restrict unorganized sprawling development which can fragment natural areas and agriculture on a larger scale.
- 2) Maintain a large contiguous open space throughout the project area to retain natural open space and corridors.
- 3) Utilize the Parks & Open Space Plan developed through this AUAR process to help preserve open space.

## **3. Sensitive resources**

### **A). Wetlands**

- 1) Continue to administer the Wetland Conservation Act and coordinate with the Army Corps of Engineers in their administration of the Clean Water Act.
- 2) Continue to have the Citizen Environmental Committee review development plans and any other project where natural resources are proposed to be impacted.
- 3) Review the City's wetland ordinance and setback distance.

### **B). Wildlife & Habitat**

- 1) Provide large contiguous open space and corridor connections to maintain wildlife habitat.
- 2) Continue to work in collaboration with Blue Earth County to develop the Greenprint Plan.
- 3) Adopt a woodland ordinance.

## **4. Physical Impacts on Water Resources**

### **A). County Ditch System**

- 1) Work with the County to take jurisdictional control of the portions of the County Ditch system within or affected by development in the City.

### **B). Wilson Creek (DNR Protected Watercourse)**

- 1) Adopt a shoreland ordinance for stricter control of development within 1000 feet of Wilson Creek.

### **C). Downstream Receiving Waters**

- 1) See narrative below under Surface Water Runoff.

## **5. Erosion & Sedimentation**

### **A). Increased construction & impervious surfaces**

- 1) Continue to develop revised rules and ordinances consistent with the MS4 program. Adopt these revisions once approved by the MPCA.

## **6. Surface Water Runoff**

### **A). Stormwater control**

- 1) Continue to develop revised rules and ordinances consistent with the MS4 program. Adopt these revisions once approved by the MPCA.

- 2) Adopt a plan that provides incentives and requirement to reduce the post development volume of runoff.
  - 3) Adopt a plan that reduces the stormwater runoff rate from the project area to a level less than predevelopment levels.
- B). Stormwater alternatives
- 1) Incorporate alternative techniques described in the AUAR report to treat stormwater runoff rate and volumes.
  - 2) Continue to use regional stormwater treatment ponds to treat stormwater runoff and reduce the overall runoff rate.
  - 3) Utilize alternative stormwater treatment methods to lower runoff volume at the site or as close as possible to the site.
  - 4) Continue to explore the possibility of reusing stormwater runoff for water use not requiring potable water supply, like irrigation.

## **7. Wastewater**

- A). Utilize the City of Mankato's public wastewater system
- B). Downstream Impacts & Improvements
- 1) Continue to update the Capital Improvements Plan (CIP) to address existing system needs.
  - 2) Follow the recommendations made to update/improve the wastewater collection system downstream of the project area.

## **8. Traffic**

- A). Increased traffic volumes
- 1) The land use density and intensity has been reduced under Land Use Scenario C from A and B. This plan needs to be followed closely in terms of land use density to ensure traffic volumes in the surrounding area do not become problematic as a result of development in the project area.
  - 2) Continue utilizing the MATAPS along with the traffic study done for the project area.
  - 3) Utilize the Planning Principles & Urban Design Alternatives developed through this AUAR process to address development patterns that focus on multi-modal gateway nodes and street orientation designed for the pedestrian in order to decrease the dependency on vehicles as the only form of travel.
  - 4) Promote development patterns which will support transit opportunities and the Bus Rapid Transit (BRT).
- B). Impacts to current and future intersections
- 1) Follow the recommendation made within the traffic study to minimize the impact on intersection level of service.
  - 2) Consider alternative intersection options for traffic control, including roundabouts.

## **9. Noise**

- A). Future traffic noise levels at proposed residential land uses within the project area are anticipated to meet or exceed State daytime and nighttime noise levels according to noise modeling completed.
- 1) Future residential areas should consider site plan elements to reduce noise levels. These elements to reduce noise on residential receptors could include berms, fencing, vegetative screening, and increased setbacks.

- 2) Consider adopting a noise ordinance and noise reduction design standards for subdivisions.

## **10. Nearby Resources**

### **A). Historic /Archaeological Resources**

- 1) As development occurs near the areas identified by the SHPO, further identification and possibly additional research and/or analysis will be needed to determine the significance of historic sites in the project area.

### **B). Parks & Trail Connections**

- 1) Continue to utilize the City of Mankato's Parks & Open Space Plan (2002) for guiding principles to preserve the natural and cultural character of the area.
- 2) Utilize the Parks & Open Space Plan developed through this AUAR process to promote park space and trail connections.

# EXHIBITS

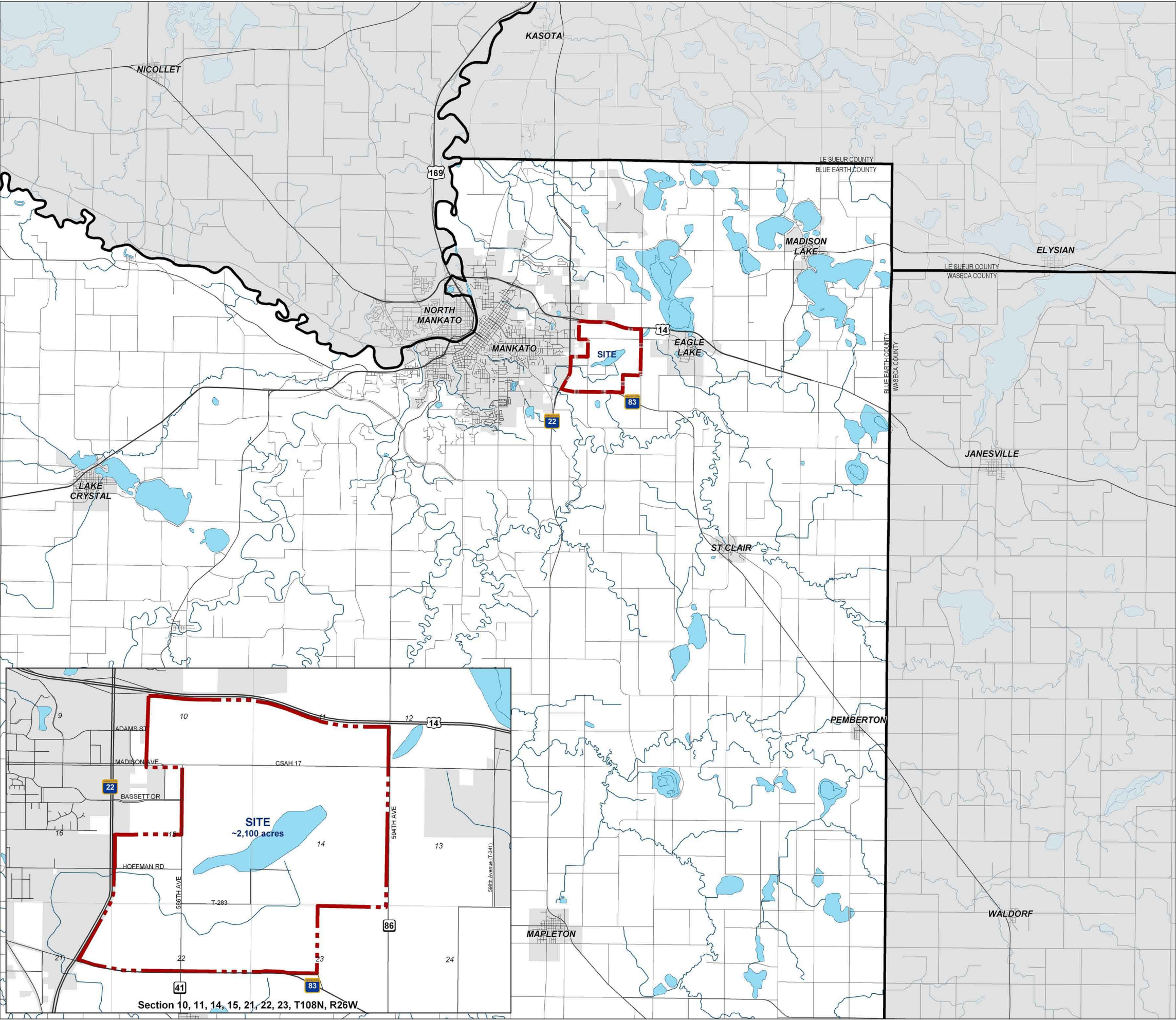
## Exhibits:

- A. Location Map
- B. USGS Topography Map
- C. AUAR Boundary Map
- D. Existing Land Use Plan
- E-1. Scenario A. Future Land Use Map
- E-2. Scenario B. Future Land Use Map
- E-3. Scenario C. Future Land Use Map
- F. Mankato Zoning Map
- G. Cover Type Map
- H. Existing Conditions Map
- I. Soil Classifications & Features Map
- J. Hydrology Features Map
- K. Potential Wetland Areas Map
- L. Area Transportation System
- M-1. Sanitary Service Areas & Sub-districts
- M-2. Improvements Required To Existing Sanitary System
- N-1. Stormwater Service Districts & Conceptual Treatment Areas
- N-2. Alternative Stormwater Treatment Concepts
- O. Water Supply System Plan
- P. Transfer Needs of the County Ditch System



LOCATION MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



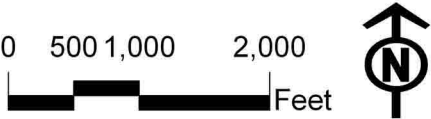


USGS TOPOGRAPHY MAP

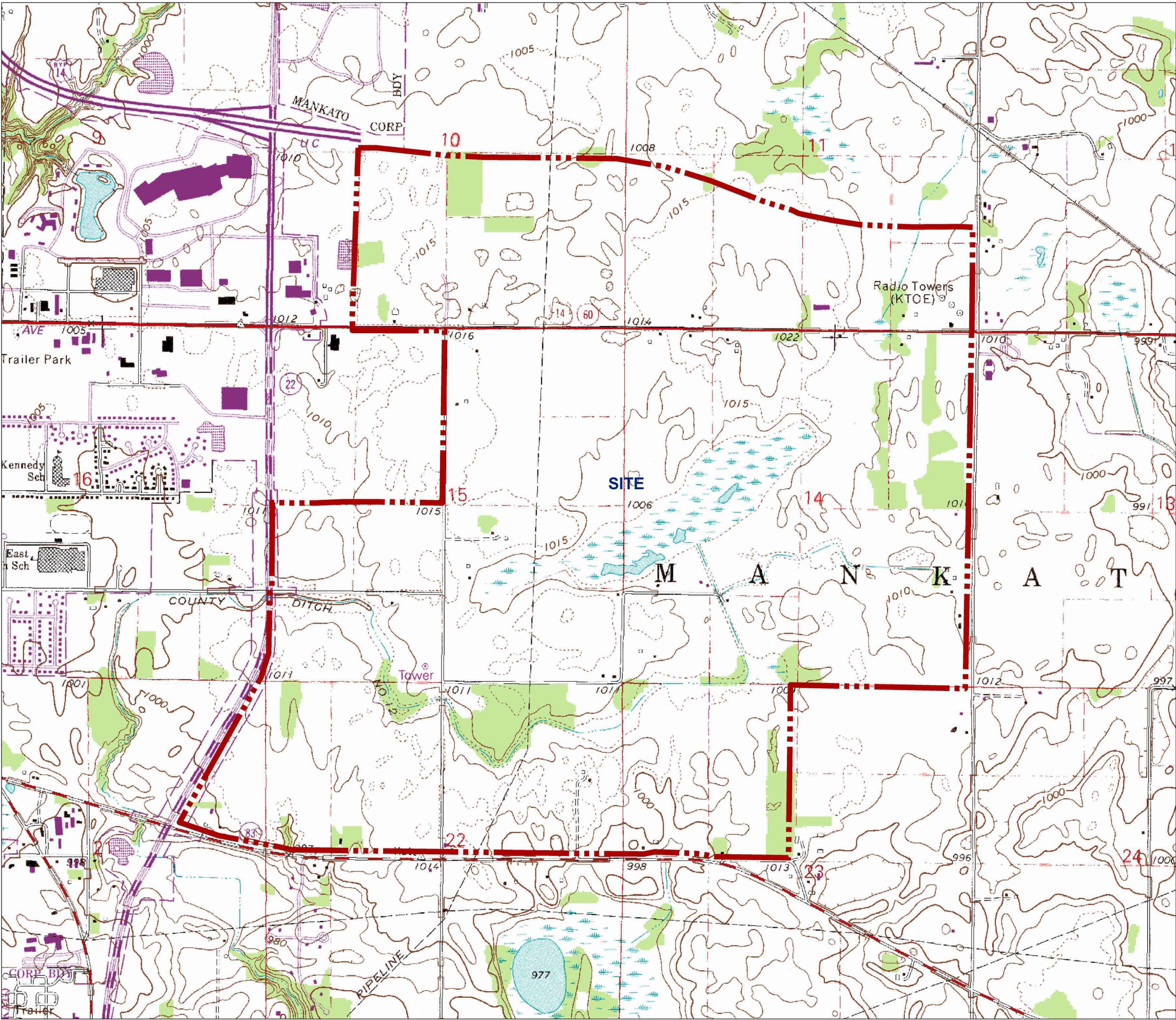
GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

LEGEND

AUAR Boundary



I&S Engineers & Architects, Inc.  
One firm - start to finish



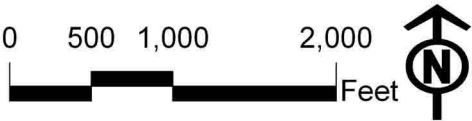


# AUAR BOUNDARY MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

LEGEND

AUAR Boundary

Sub-District Areas

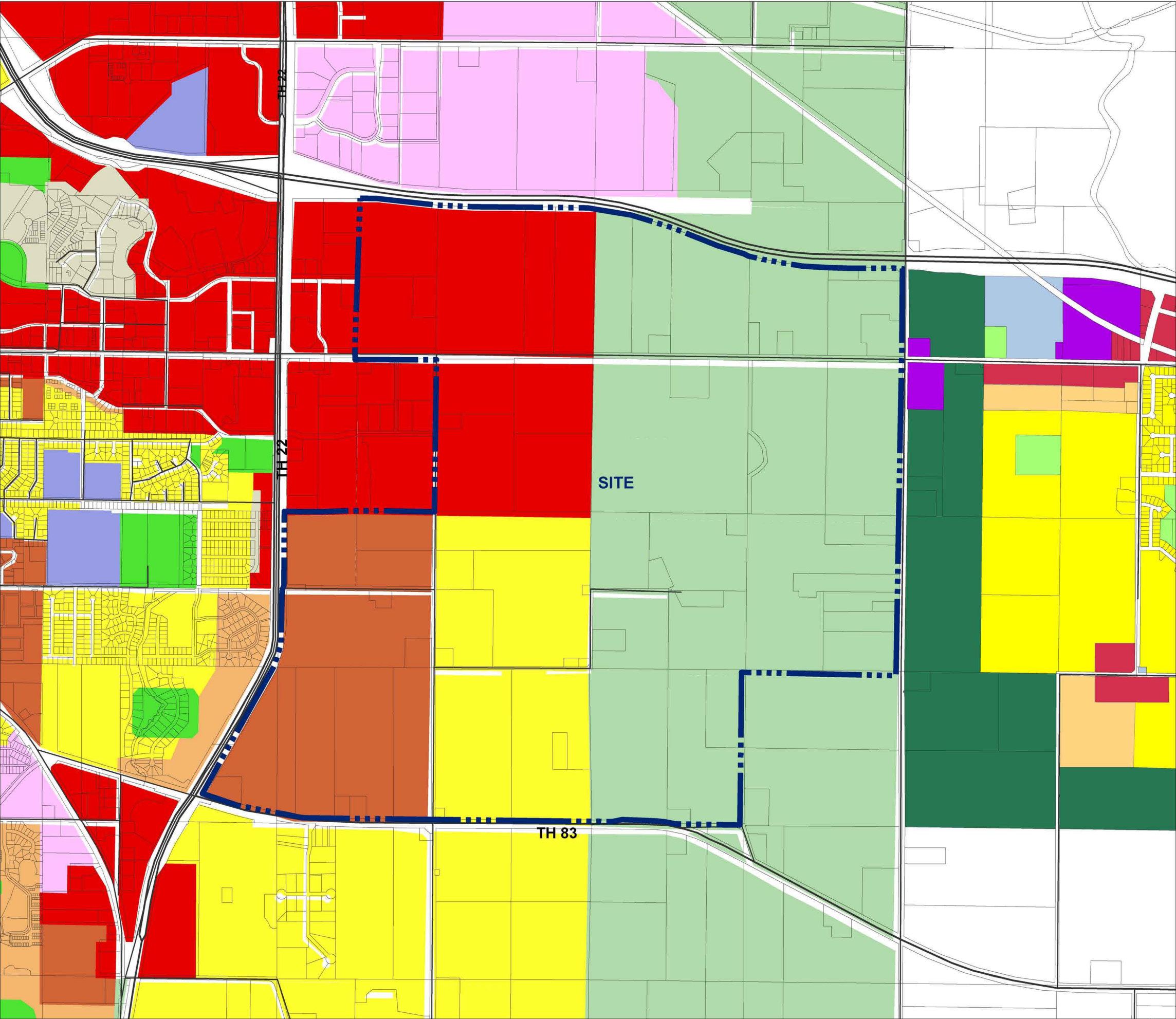
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# EXISTING LAND USE PLAN

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

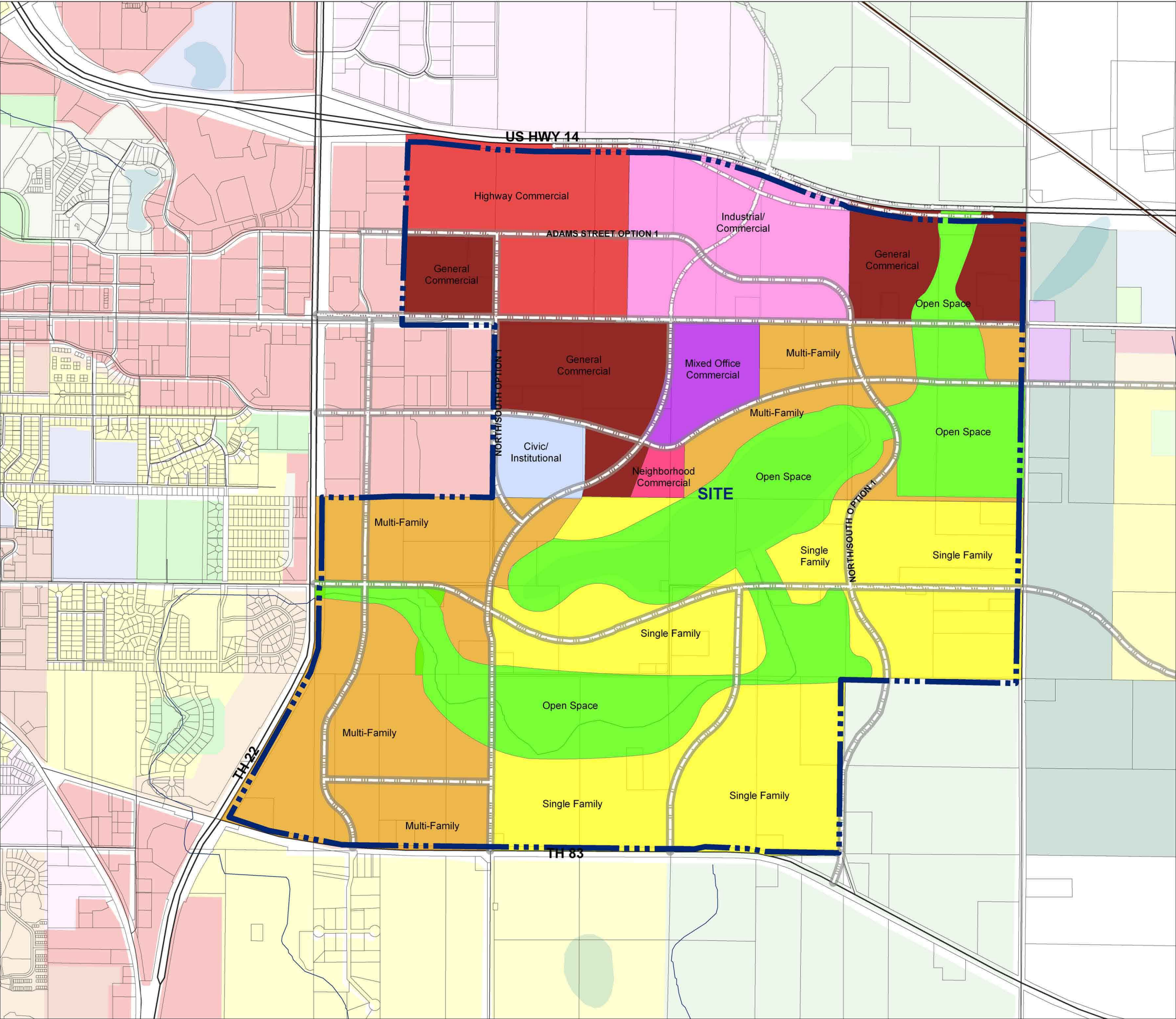
|                              |                                 |
|------------------------------|---------------------------------|
| <b>Mankato Land Use Plan</b> | <b>Eagle Lake Land Use Plan</b> |
| Agriculture                  | Low Density Residential         |
| Commercial                   | Medium Density Residential      |
| Light Industry               | Office Residential              |
| Low Density Residential      | Commercial                      |
| High Density Residential     | Light Industrial                |
| Medium Density Residential   | Park, Recreation, Open Space    |
| Office Residential           | Agriculture                     |
| Park, Recreation, Open Space | Public/Semi Public              |
| Public & Semi Public         |                                 |





# SCENARIO A. FUTURE LAND USE MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Proposed Road & 120' ROW
- Scenario A Land Use**
- Single Family Residential
- Multi-Family Residential
- General Commercial
- Highway Commercial
- Neighborhood Commercial
- Industrial/Commercial
- Mixed Office Commercial
- Civic/Institutional
- Open Space

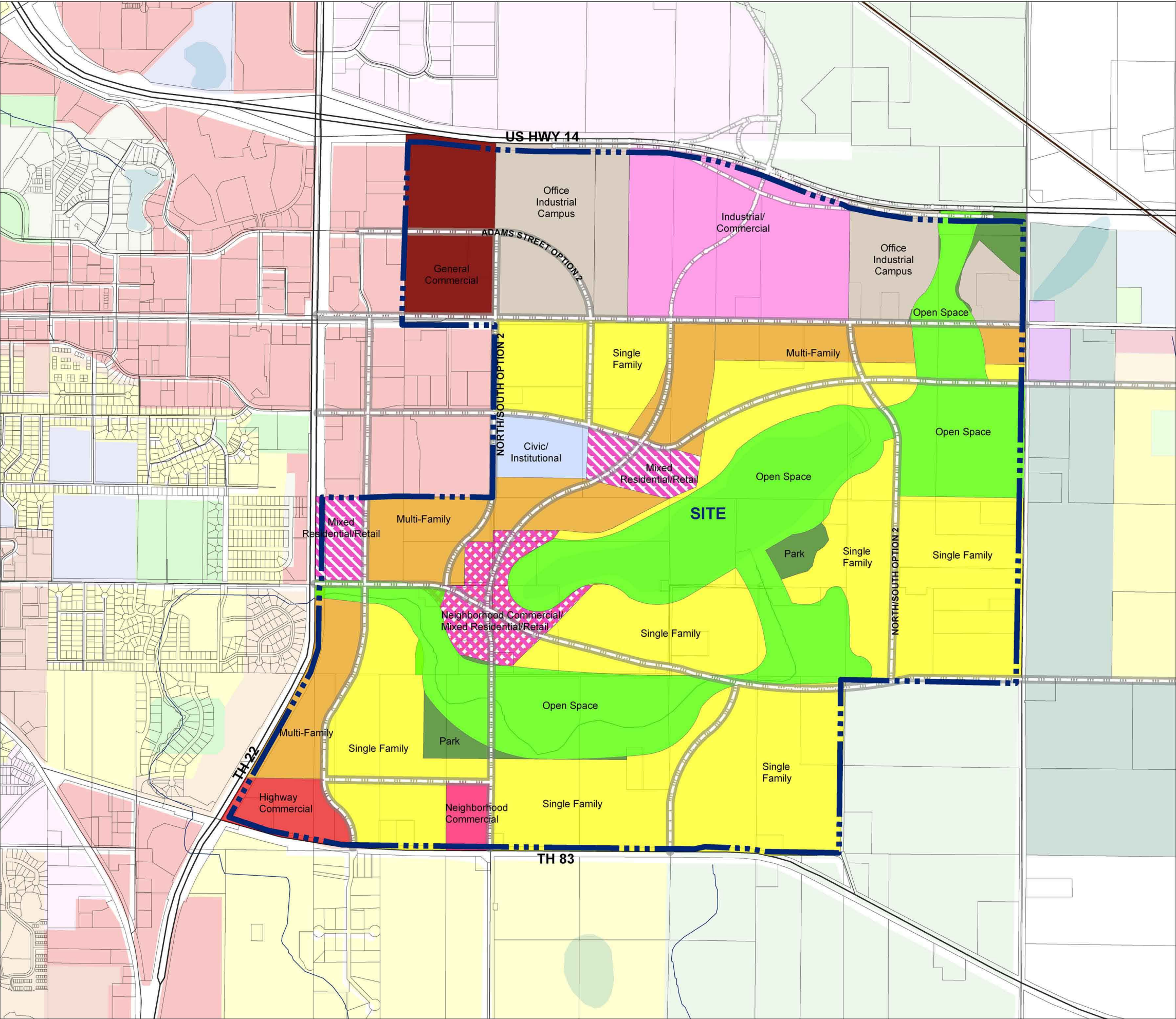


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# SCENARIO B. FUTURE LAND USE MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA




**LEGEND**

■ AUAR Boundary  
▬ Proposed Road & 120' ROW

**Scenario B Land Use**

- Single Family Residential
- Multi-Family Residential
- General Commercial
- Highway Commercial
- Neighborhood Commercial
- Mixed Residential/Retail
- Neighborhood Commercial-Mixed Res/Retail
- Industrial/Commercial
- Office Industrial Campus
- Civic/Institutional
- Open Space
- Park

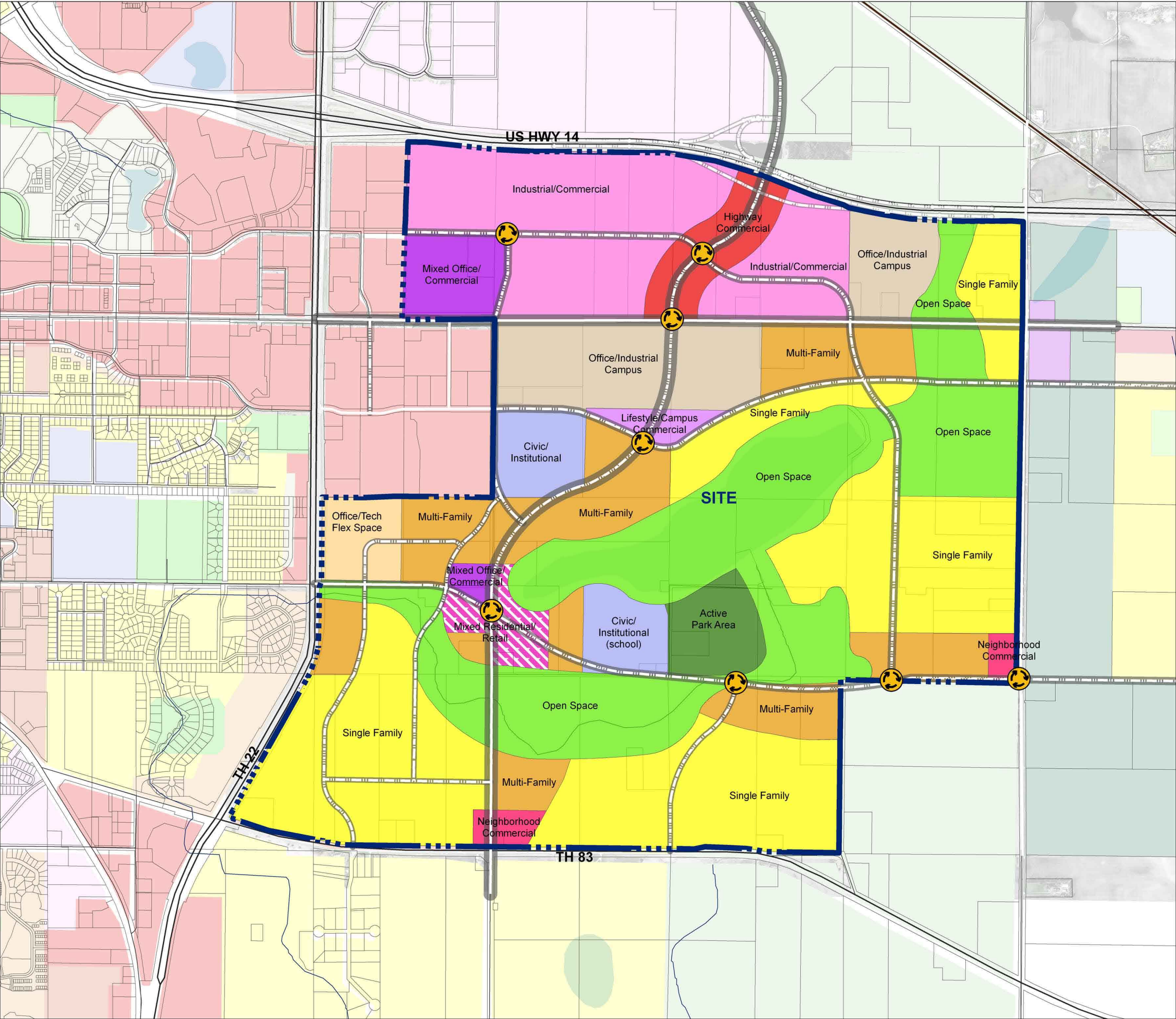


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# SCENARIO C. FUTURE LAND USE MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Proposed Road & Right-Of-Way
- Proposed Roundabout

**Scenario C Land Use**

- Single Family Residential
- Multi-Family Residential
- Highway Commercial
- Neighborhood Commercial
- Mixed Residential/Retail
- Industrial Commercial
- Lifestyle Center Commercial
- Mixed Office Commercial
- Office Industrial Campus
- Office/Tech Flex Space
- Civic/Institutional/School
- Open Space
- Active Park & Recreation Area

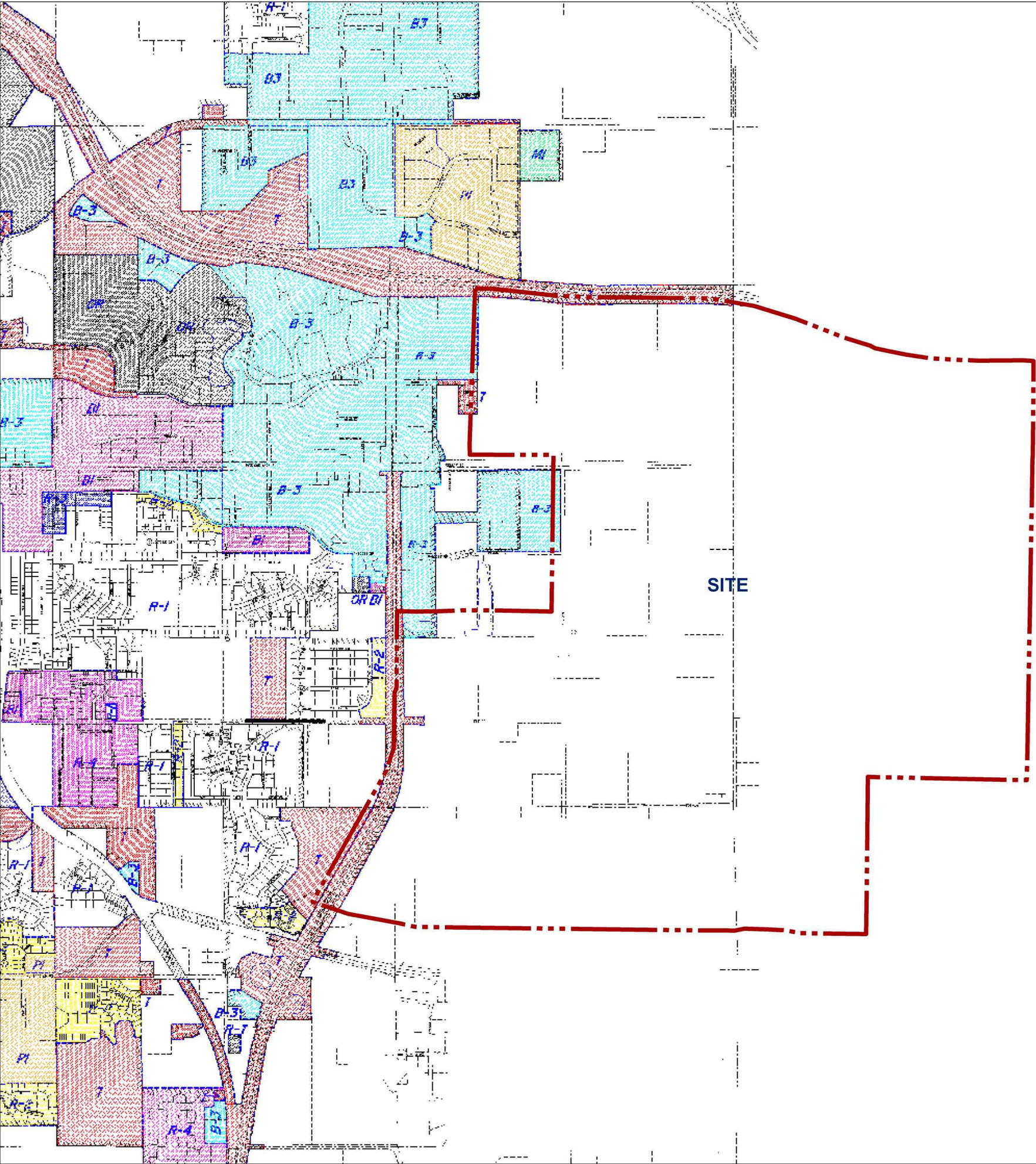


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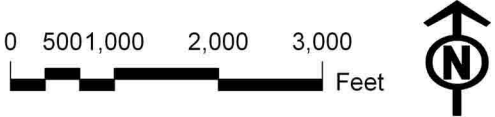
# MANKATO ZONING MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

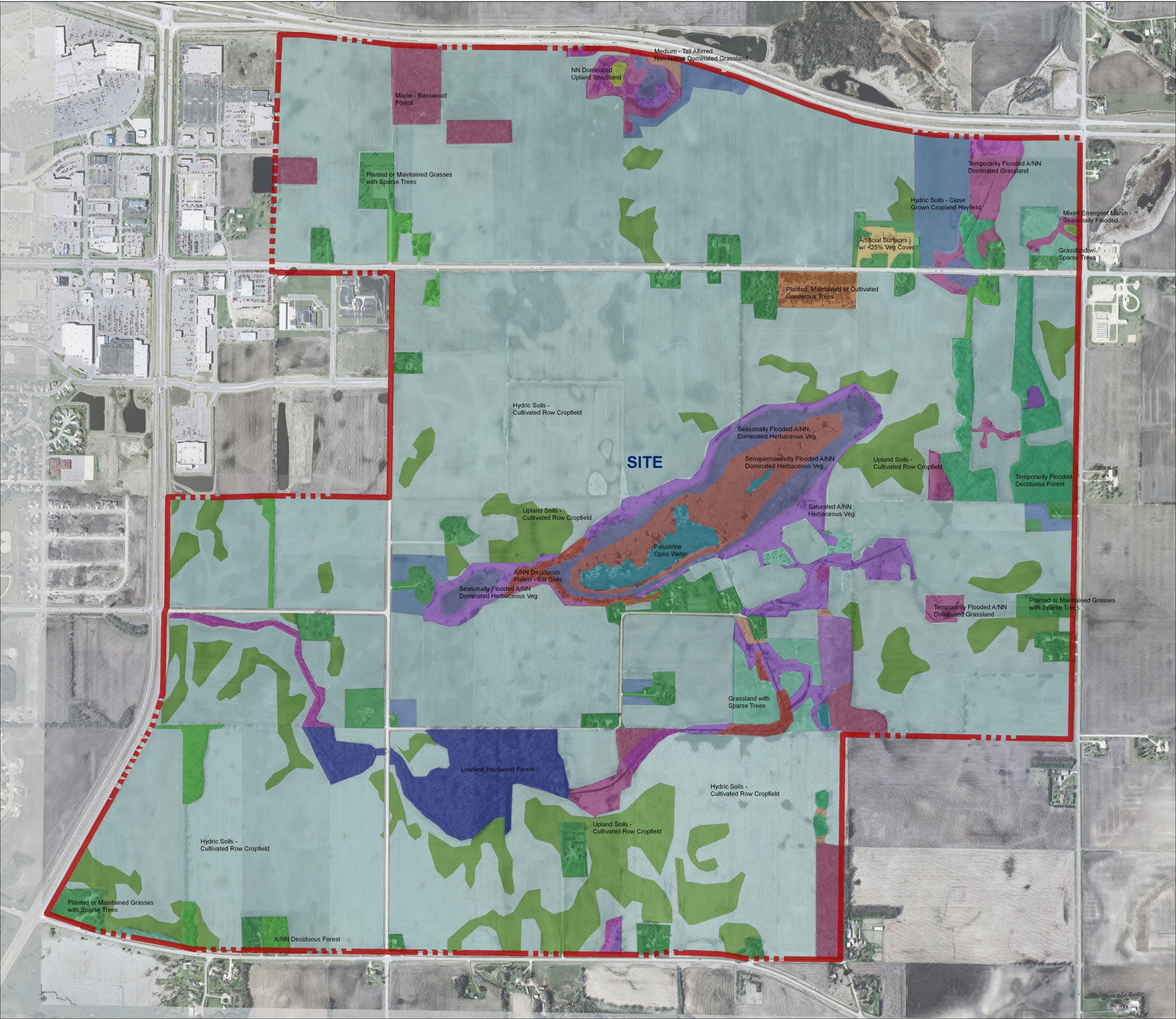
- AUAR Boundary
- T Transition District
- R-1 One-Family Dwelling
- R-2 One & Two Family Dwelling
- R-4 Multiple Dwelling
- OR Office Residential
- B-1 Community Business District
- B-3 Highway Business District
- Pi Planned Industrial
- M-1 Light Industrial
- M-2 Heavy Industrial





COVER TYPE MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Hydric Soils - Close Grown Cropland Hayfield
- A/NN Deciduous Forest
- A/NN Deciduous Forest - Sat. Soil
- A/NN Temporarily Flooded Deciduous Forest
- Artificial Surfaces With Less than 25% Veg Cover
- Grassland with Sparse Trees
- Lowland Hardwood Forest
- Maple - Basswood Forest
- Medium-Tall Altered Non-Native Dominated Grassland
- Mixed Emergent Marsh - Seasonally Flooded
- NN Dominated Herbaceous Veg w/ Sparse Dec. Trees
- NN Dominated Upland Shrubland
- Palustrine Open Water
- Planted or Maintained Grasses with Sparse Trees
- Planted, Maintained or Cultivated Coniferous Trees
- Saturated A/NN Herbaceous Vegetation
- Seasonally Flooded A/NN Dominated Herbaceous Veg
- Semipermanently Flooded A/NN Herbaceous Veg
- Temporarily Flooded A/NN Dominated Grassland
- Temporarily Flooded Deciduous Forest
- Upland Soils - Cultivated Row Cropfield
- Hydric Soils - Cultivated Row Cropfield

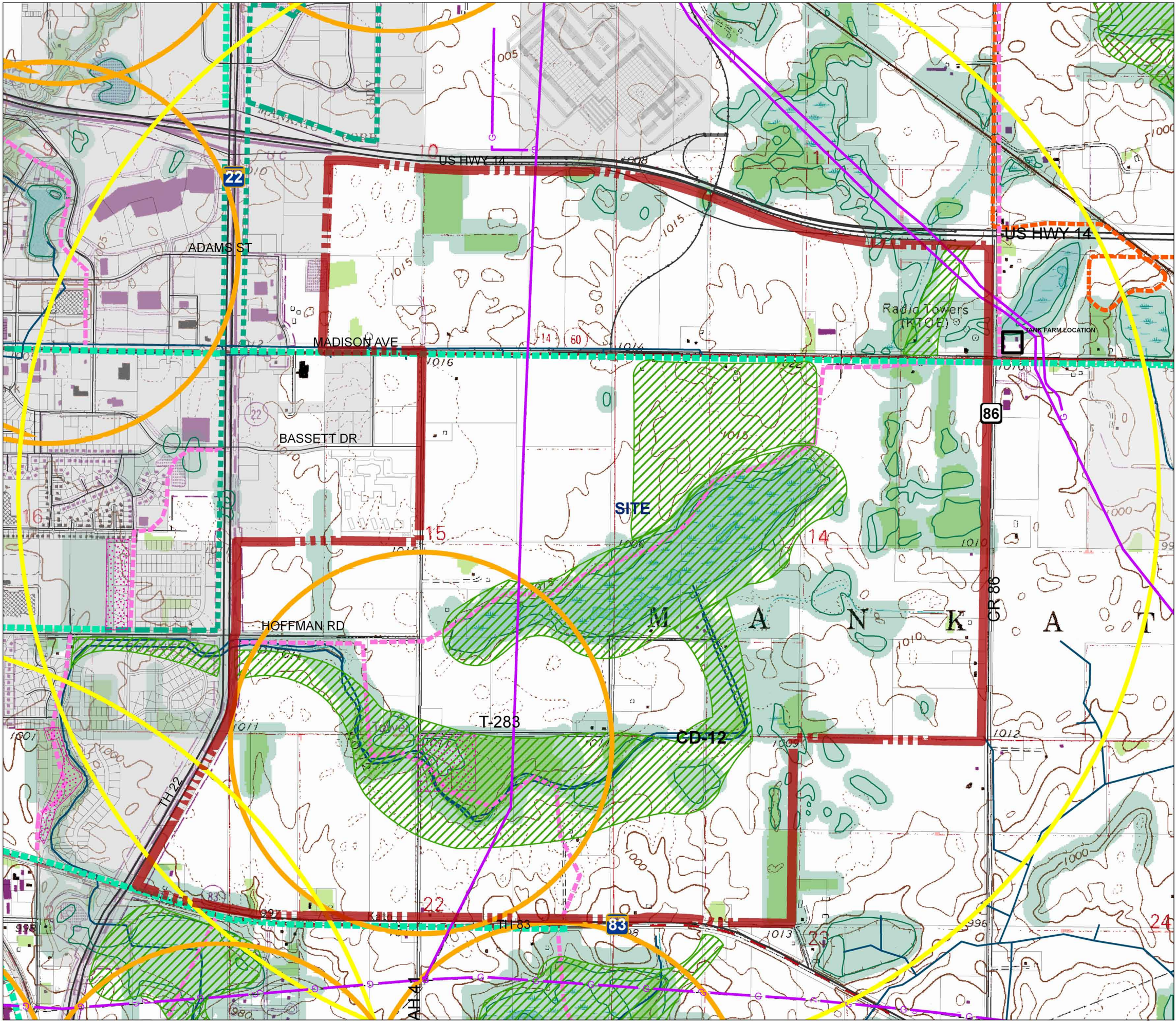


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# EXISTING CONDITIONS MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Streams/Ditches
- NWI
- Existing Gas Line
- Existing Mankato Trail System
- Existing Eagle Lake Trail System
- Proposed Trail
- Conceptual Future Trail
- Area Needing Future Neighborhood Park
- Area Needing Future Community Park
- Proposed Park
- Targeted Natural Resource Areas
- Blue Earth County Greenprint



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# SOIL CLASSIFICATIONS & FEATURES MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

**LEGEND**

■ AUAR Boundary

**Prime Farmland**

- ▨ Farmland of Statewide Importance
- ▨ All Areas are Prime Farmland
- ▨ Prime Farmland if Drained

**Erodible Soils**

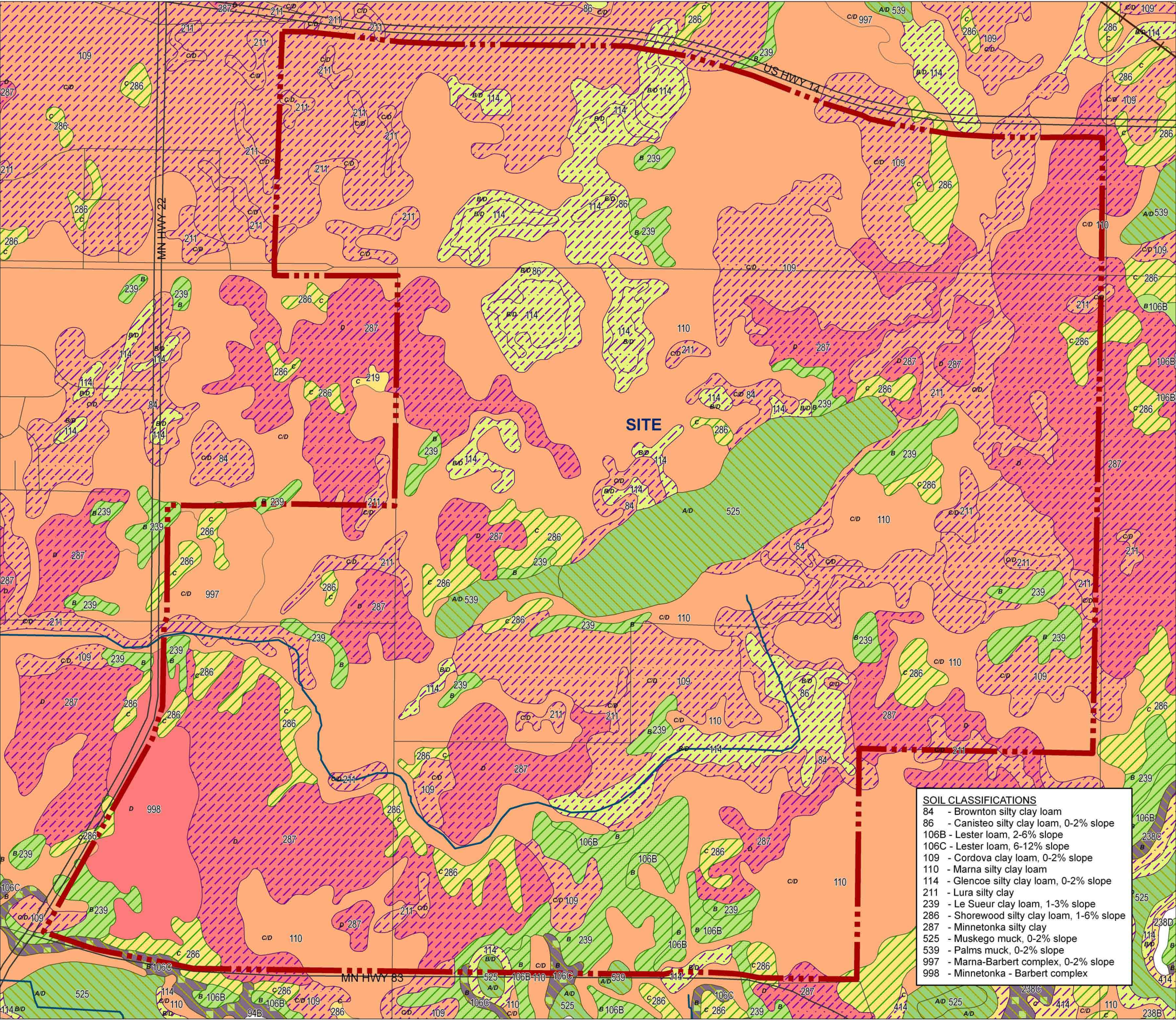
- Potential Highly Erodible Soils

**Hydrologic Group**

- A/D
- B
- B/D
- C
- C/D
- D



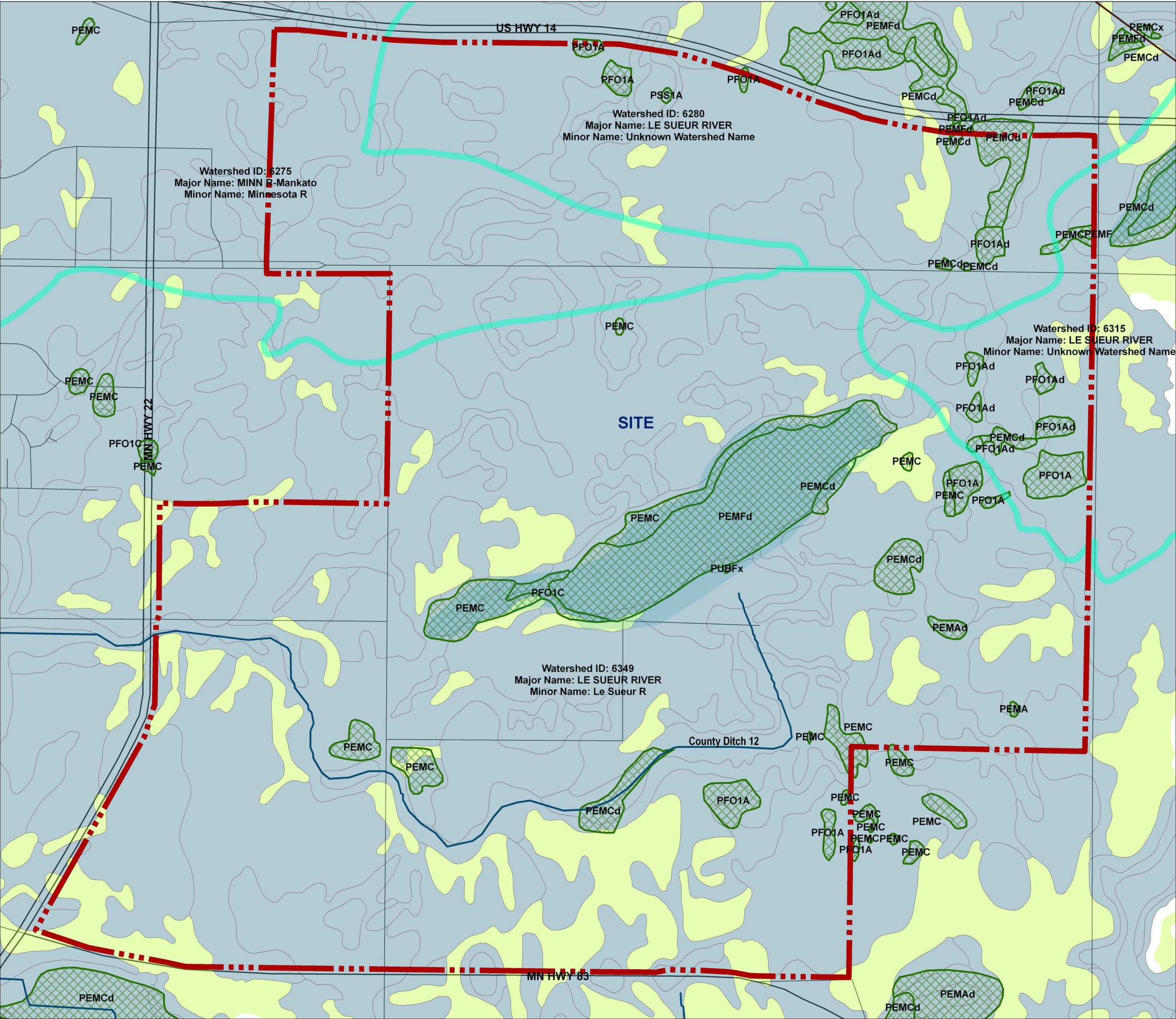
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# HYDROLOGY FEATURES MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Streams/Ditches
- Watershed Boundary
- FEMA Floodplain
- National Wetland Inventory
- Hydric Soils**
- Hydric Soils
- Non-Hydric Soils



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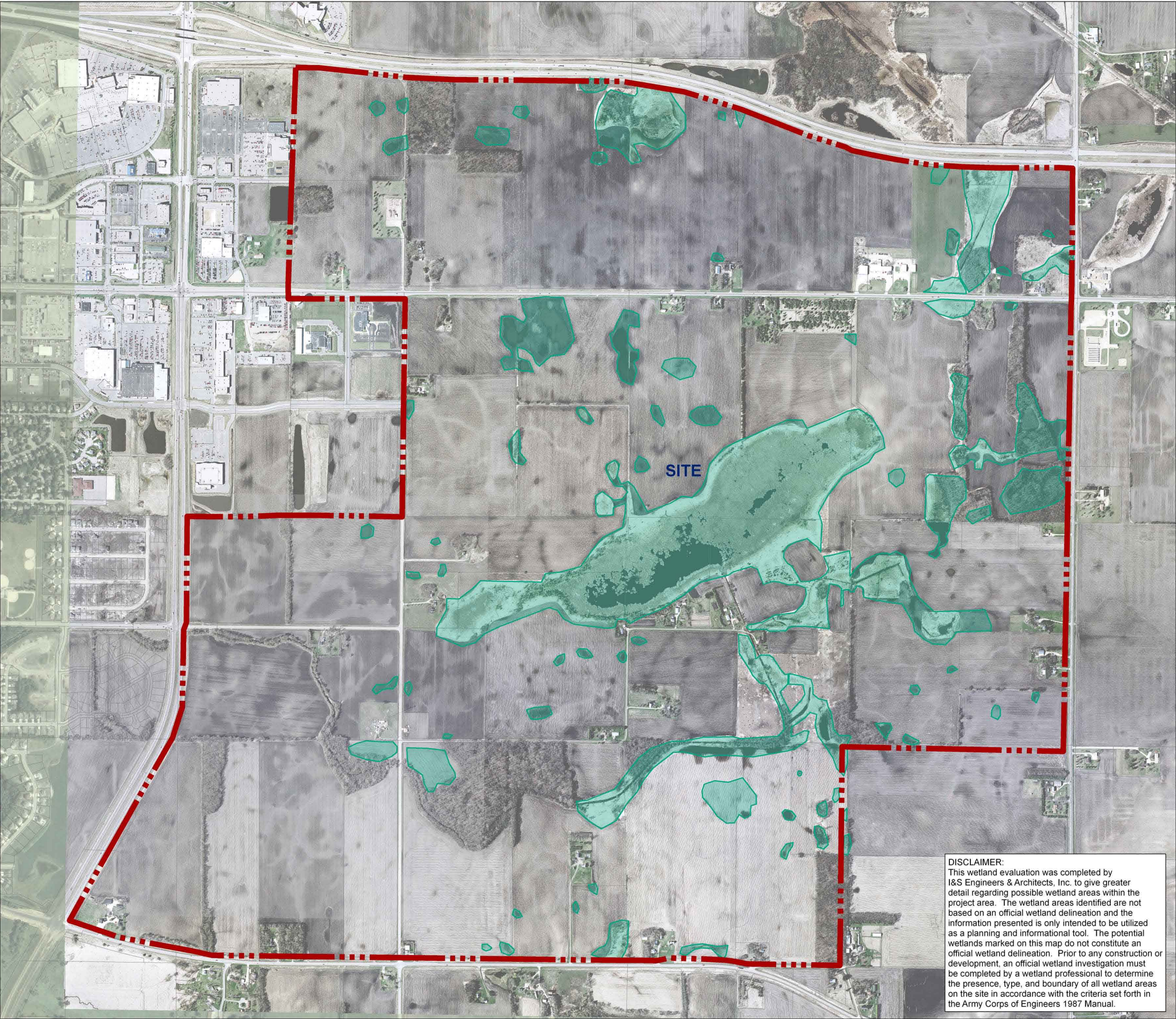
# POTENTIAL WETLAND AREAS MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

LEGEND

AUAR Boundary

Potential Wetland Areas



DISCLAIMER:  
This wetland evaluation was completed by I&S Engineers & Architects, Inc. to give greater detail regarding possible wetland areas within the project area. The wetland areas identified are not based on an official wetland delineation and the information presented is only intended to be utilized as a planning and informational tool. The potential wetlands marked on this map do not constitute an official wetland delineation. Prior to any construction or development, an official wetland investigation must be completed by a wetland professional to determine the presence, type, and boundary of all wetland areas on the site in accordance with the criteria set forth in the Army Corps of Engineers 1987 Manual.



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# AREA TRANSPORTATION SYSTEM

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

LEGEND

AUAR Area

Proposed Roads & Right-of-Way

Existing Traffic Volumes

Roadways not analyzed

- Less than 500
- 500-1,999
- 2,000-4,999
- 5,000-10,000
- Greater than 10,000

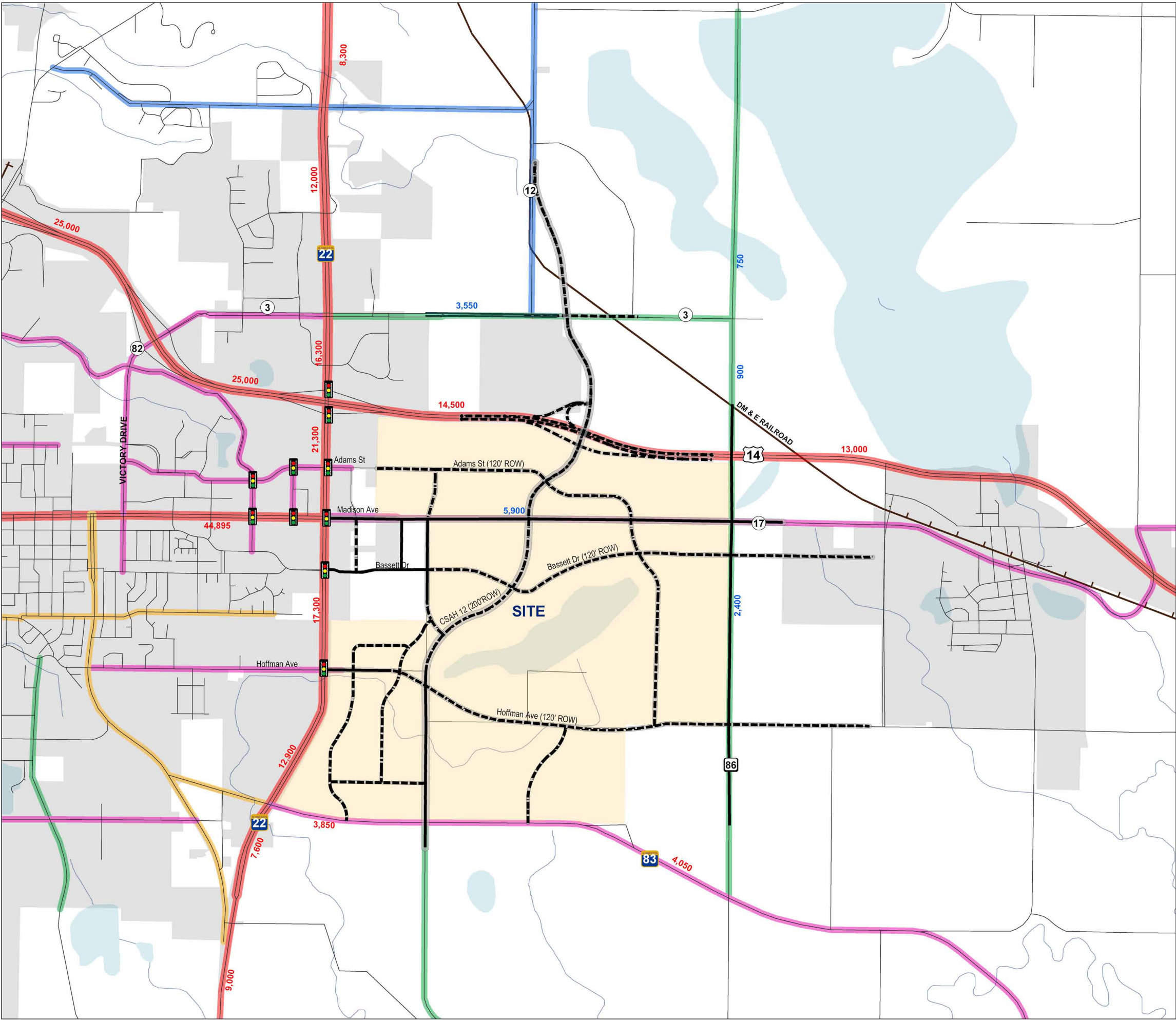
NUMBERS INDICATE AVERAGE ANNUAL DAILY TRAFFIC VOLUMES ON DESIGNATED ROADS

Trunk Highway Routes are 2004 AADT

County System Roads are 2005 AADT



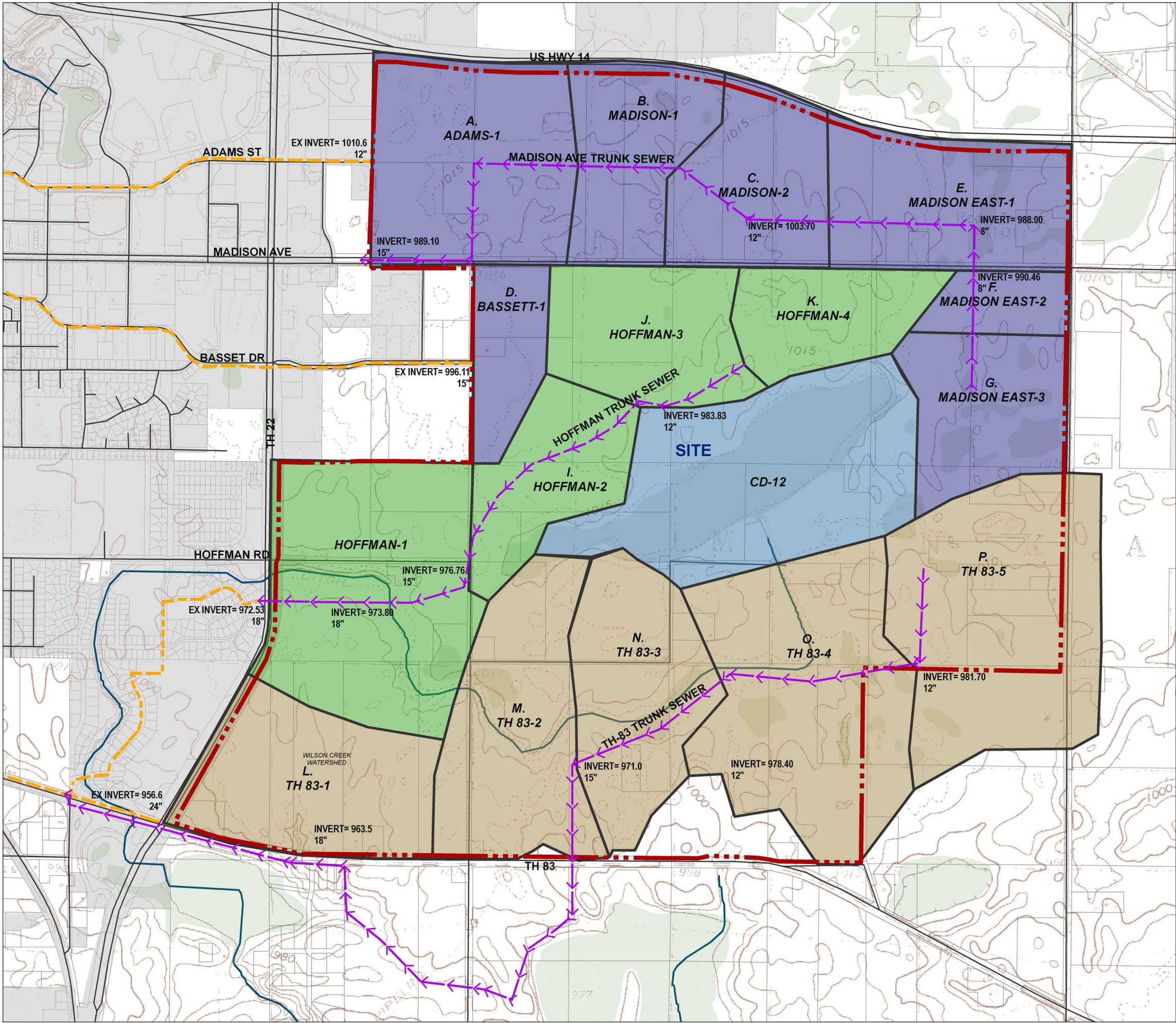
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# SANITARY SERVICE AREAS & SUB-DISTRICTS

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Sanitary Sub-Districts
- Parcel Lines
- Existing Sanitary Trunklines
- Proposed Sanitary Trunklines

**Trunk Service Areas**

- Glenwood Ave (TH 83)
- Thompson Ravine (Adams, Bassett, Madison)
- County Ditch 12
- Glenwood Ave (Hoffman Rd)





# IMPROVEMENTS REQUIRED TO EXISTING SANITARY SYSTEM

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

**LEGEND**

AUAR Boundary

Inplace Sanitary Trunk System

Proposed Sanitary Trunk System Within Project Area

**Trunk Lines Needing Improvement**

*Development Percentage of Sewershed*

100+% (When Needed)

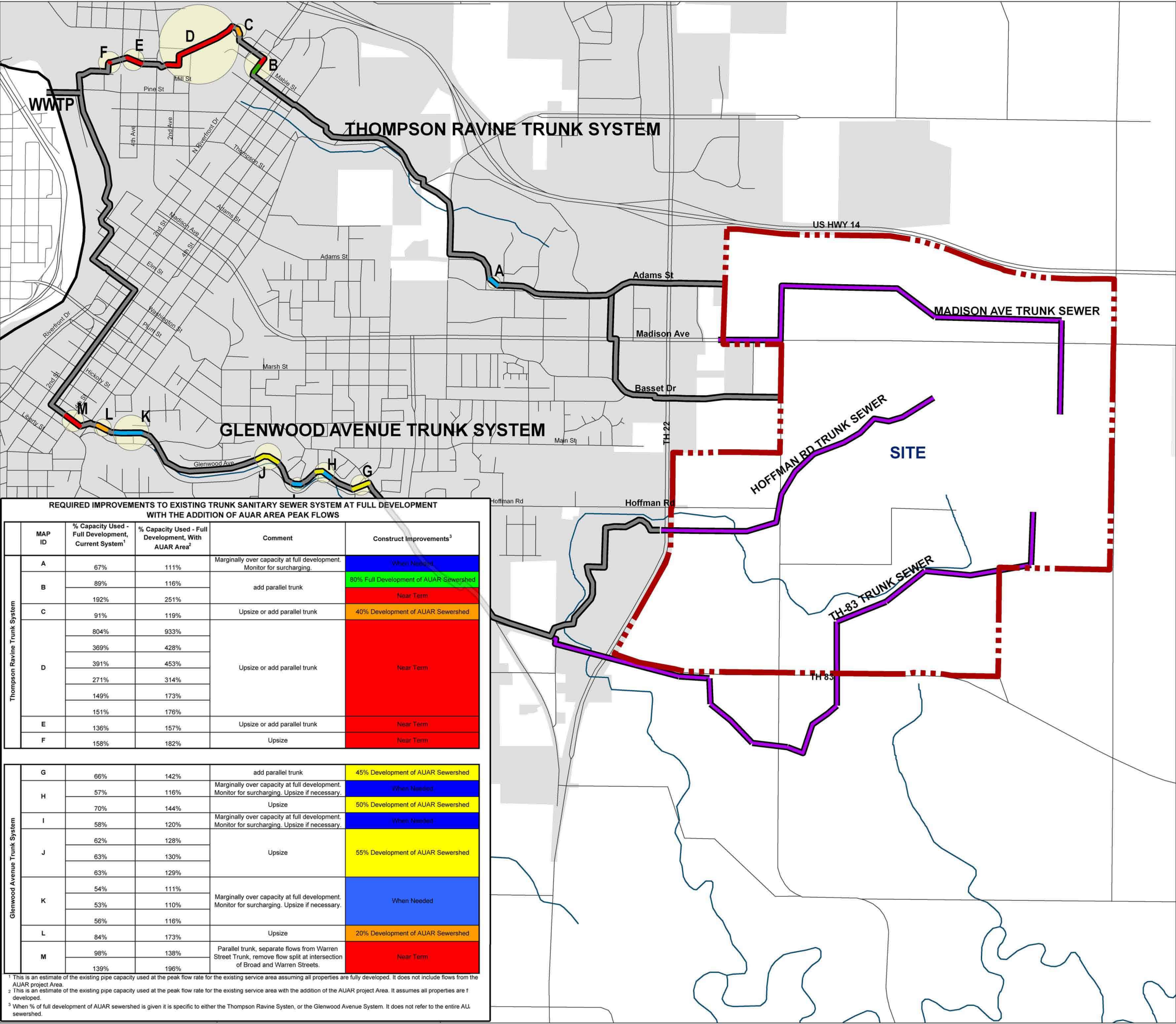
80-100%

60-80%

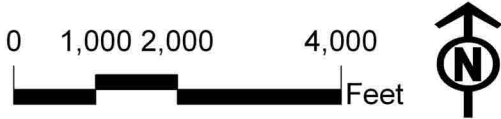
40-60%

20-40%

0-20% (Near Term)



| REQUIRED IMPROVEMENTS TO EXISTING TRUNK SANITARY SEWER SYSTEM AT FULL DEVELOPMENT WITH THE ADDITION OF AUAR AREA PEAK FLOWS  |        |   |   |   |  |
|--|--------|---|---|---|--|
|  | MAP ID | % Capacity Used - Full Development, Current System <sup>1</sup> | % Capacity Used - Full Development, With AUAR Area <sup>2</sup>   | Comment   | Construct Improvements <sup>3</sup>    |
| Thompson Ravine Trunk System   | A      | 67%   | 111%  | Marginally over capacity at full development. Monitor for surcharging.                      | When Needed                            |
|  | B      | 89%   | 116%  | add parallel trunk  | 80% Full Development of AUAR Sewershed |
|  |        | 192%  | 251%  |   | Near Term                              |
|  | C      | 91%   | 119%  | Upsize or add parallel trunk  | 40% Development of AUAR Sewershed      |
|  | D      | 804%  | 933%  | Upsize or add parallel trunk  | Near Term                              |
|  |        | 369%  | 428%  |   |  |
|  |        | 391%  | 453%  |   |  |
|  |        | 271%  | 314%  |   |  |
|  |        | 149%  | 173%  |   |  |
|  |        | 151%  | 176%  |   |  |
| E  | 136%   | 157%  | Upsize or add parallel trunk  | Near Term   |  |
| F  | 158%   | 182%  | Upsize  | Near Term   |  |
| Glenwood Avenue Trunk System   | G      | 66%   | 142%  | add parallel trunk  | 45% Development of AUAR Sewershed      |
|  | H      | 57%   | 116%  | Marginally over capacity at full development. Monitor for surcharging. Upsize if necessary. | When Needed                            |
|  |        | 70%   | 144%  | Upsize  | 50% Development of AUAR Sewershed      |
|  | I      | 58%   | 120%  | Marginally over capacity at full development. Monitor for surcharging. Upsize if necessary. | When Needed                            |
|  | J      | 62%   | 128%  | Upsize  | 55% Development of AUAR Sewershed      |
|  |        | 63%   | 130%  |   |  |
|  |        | 63%   | 129%  |   |  |
|  | K      | 54%   | 111%  | Marginally over capacity at full development. Monitor for surcharging. Upsize if necessary. | When Needed                            |
|  |        | 53%   | 110%  |   |  |
|  |        | 56%   | 116%  |   |  |
| L  | 84%    | 173%  | Upsize  | 20% Development of AUAR Sewershed   |  |
| M  | 98%    | 138%  | Parallel trunk, separate flows from Warren Street Trunk, remove flow split at intersection of Broad and Warren Streets. | Near Term   |  |
|  | 139%   | 196%  |   |   |  |
| <sup>1</sup> This is an estimate of the existing pipe capacity used at the peak flow rate for the existing service area assuming all properties are fully developed. It does not include flows from the AUAR project Area. |        |   |   |   |  |
| <sup>2</sup> This is an estimate of the existing pipe capacity used at the peak flow rate for the existing service area with the addition of the AUAR project Area. It assumes all properties are fully developed.         |        |   |   |   |  |
| <sup>3</sup> When % of full development of AUAR sewershed is given it is specific to either the Thompson Ravine System, or the Glenwood Avenue System. It does not refer to the entire AU, sewershed.                      |        |   |   |   |  |



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# STORMWATER SERVICE DISTRICTS & CONCEPTUAL TREATMENT AREAS

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

**LEGEND**

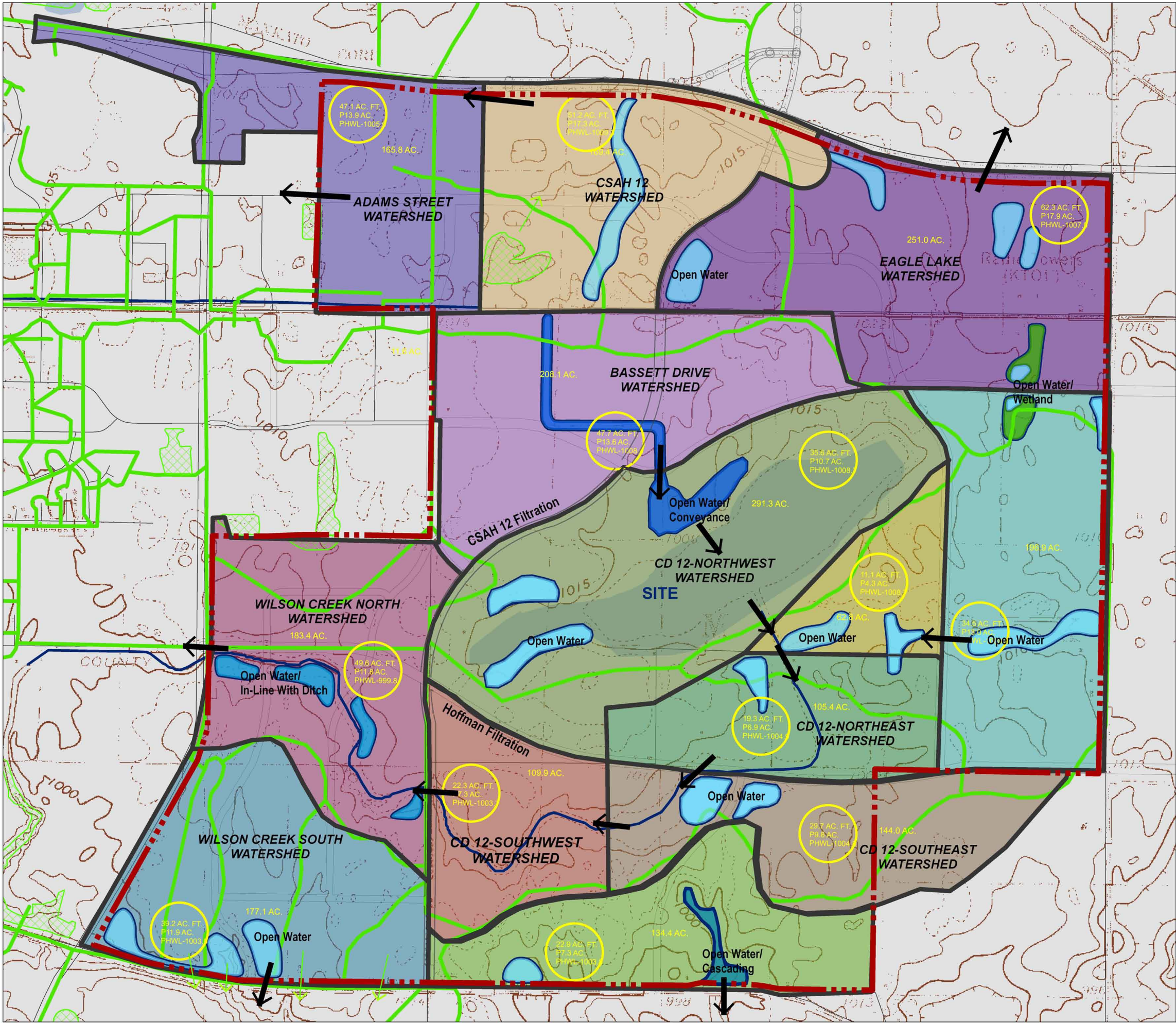
- AUAR Boundary
- Proposed Roads
- Storm Watershed Lines (Drainage Report-1997)
- Stormwater Districts
- Watershed Information

**Conceptual Treatment Areas**

- Open Water
- Open Water-In-Line w/ Ditch
- Open Water-Cascading
- Open Water-Conveyance
- Open Water-Wetland



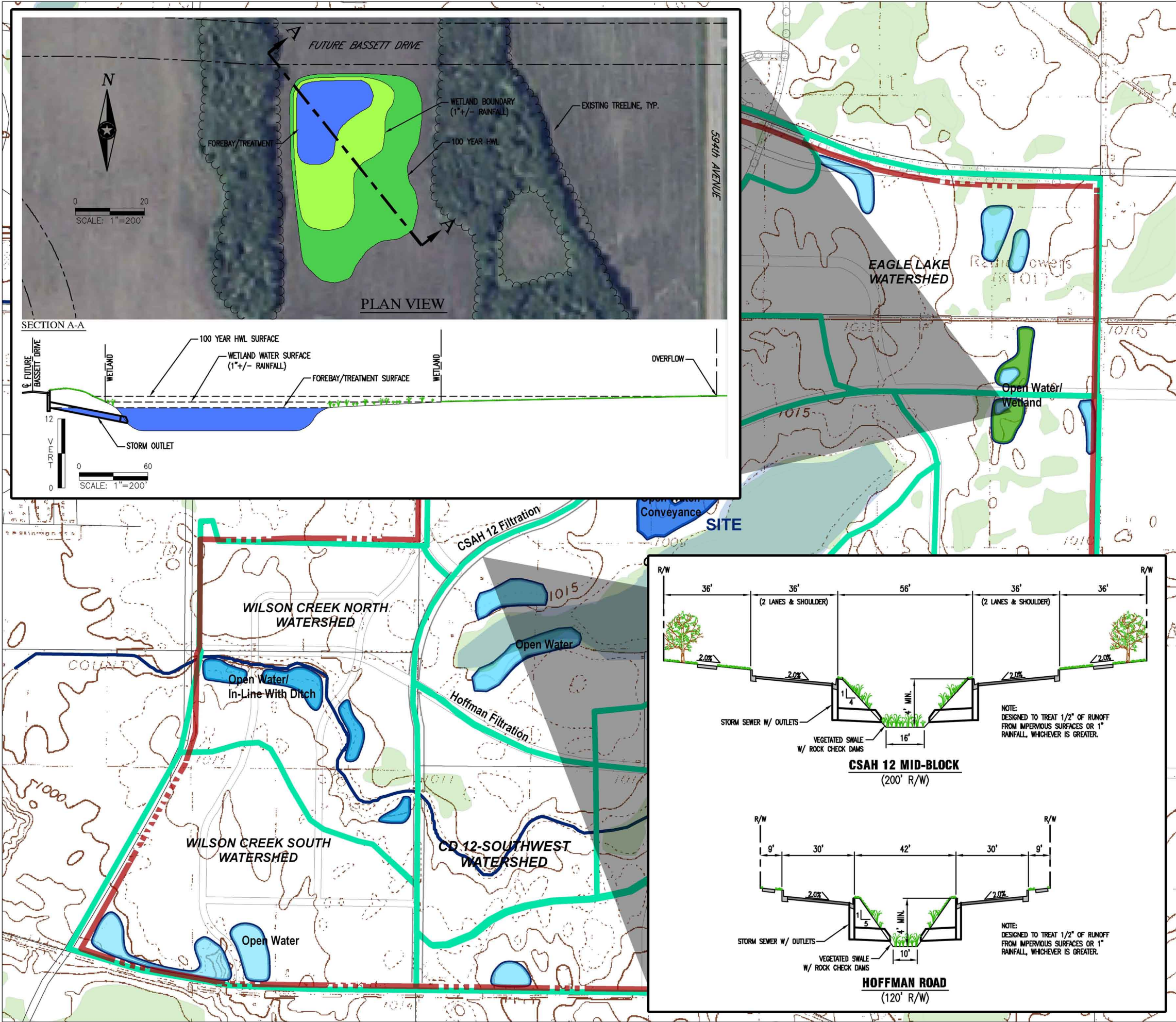
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# ALTERNATIVE STORMWATER TREATMENT CONCEPTS

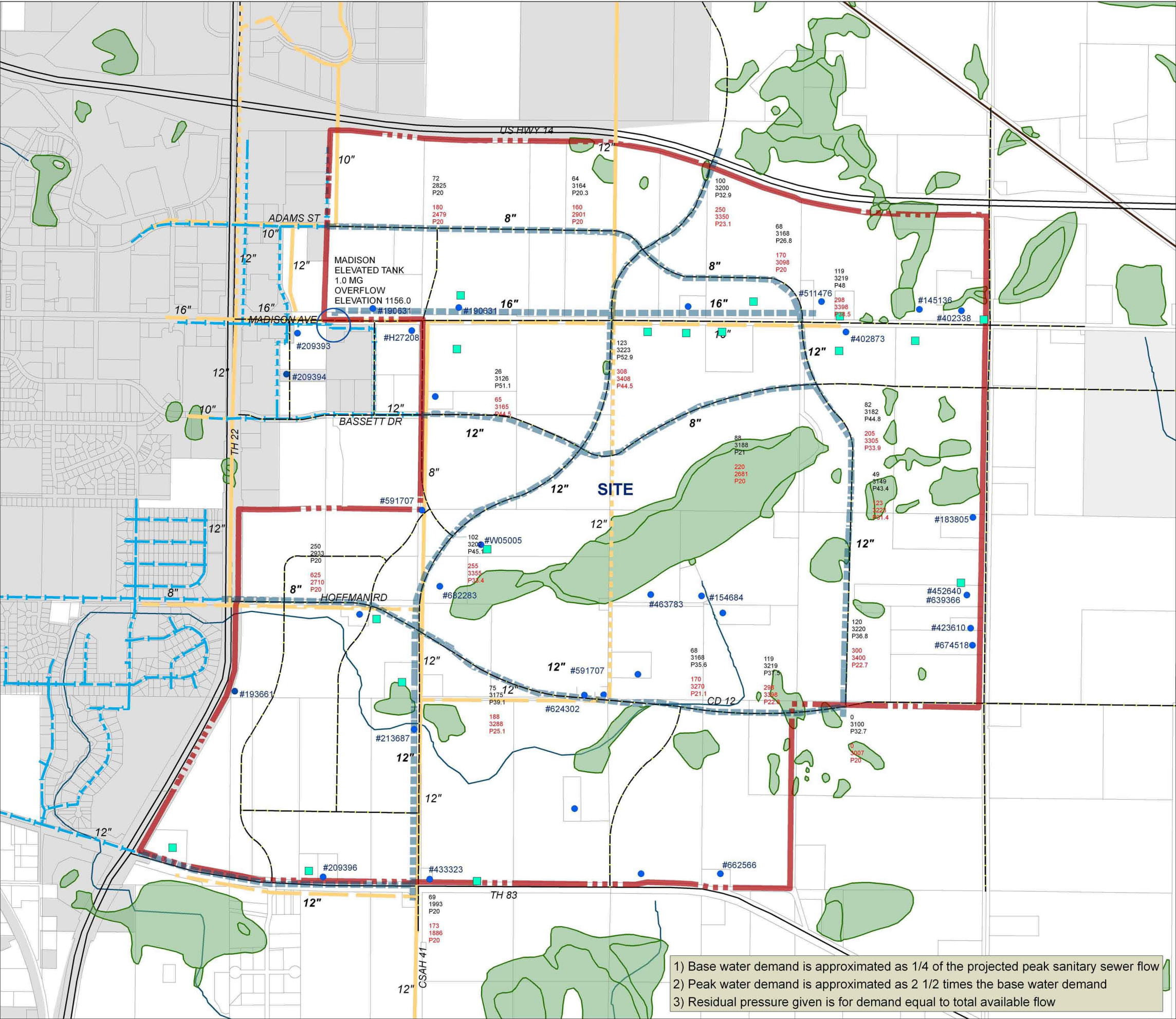
GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA





# WATER SUPPLY SYSTEM PLAN

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- - - Existing Watermain
- - - Proposed Watermain (Black & Veatch)
- - - Proposed Watermain
- County Well Index
- Possible Well Locations (Blue Earth County)
- NWI
- City Limits
- Parcel Lines

**WATERMAIN ANNOTATION**

000 = Demand (GPM)  
 BASE 0000 = Total Available Flow (GPM)  
 00.0 = Residual Pressure (PSI)

**PEAK** 000 = Demand  
 0000 = Total Available Flow (GPM)  
 0.00 = Residual Pressure (PSI)

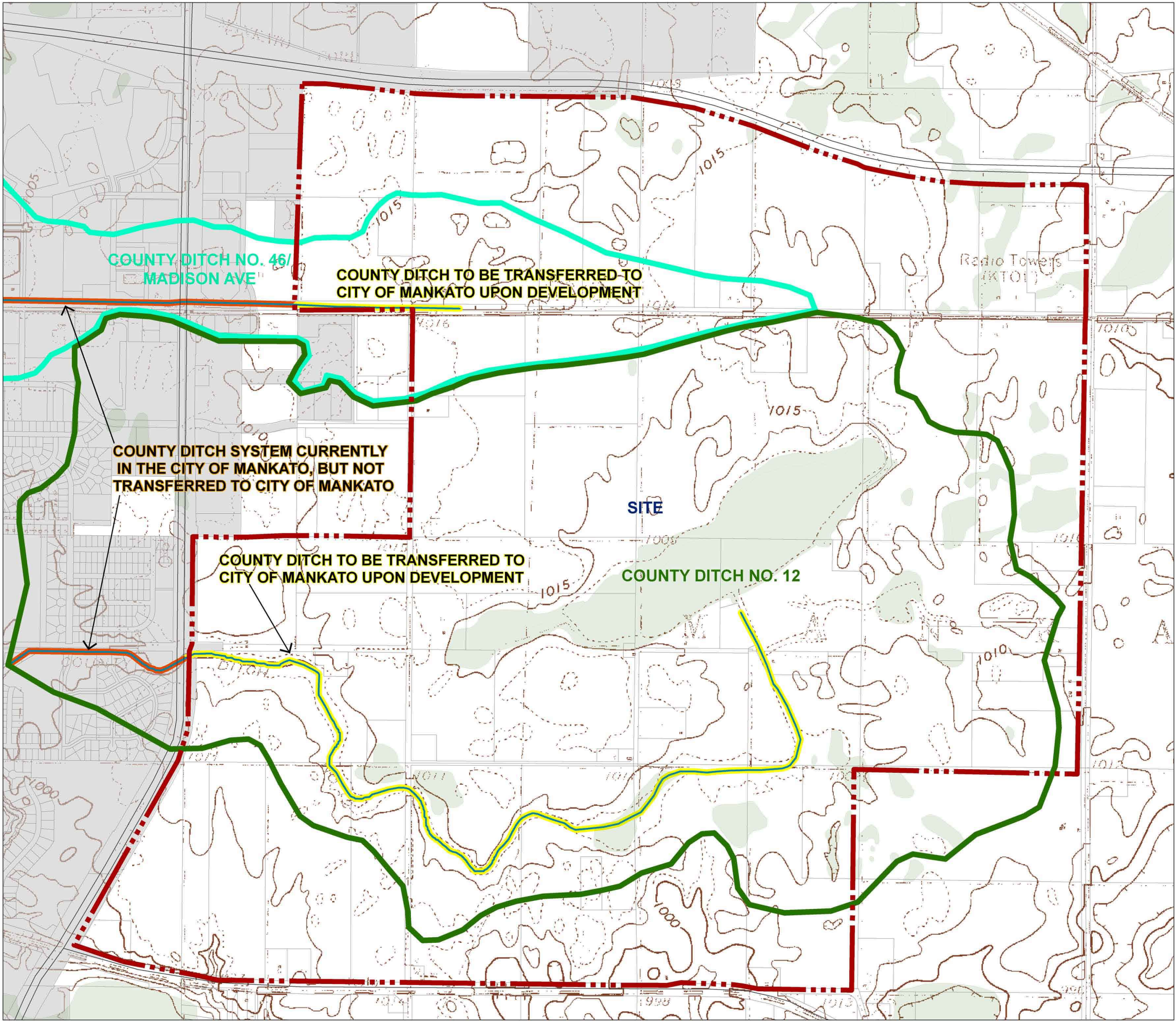


- 1) Base water demand is approximated as 1/4 of the projected peak sanitary sewer flow
- 2) Peak water demand is approximated as 2 1/2 times the base water demand
- 3) Residual pressure given is for demand equal to total available flow



**TRANSFER NEEDS  
OF THE COUNTY  
DITCH SYSTEM**

**GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA**



**LEGEND**

- AUAR Boundary
- CD-12 Watershed
- CD-46/Madison Avenue Watershed
- Ditch to be transferred to city upon development
- Ditch currently in city limits, but not transferred
- City Limits
- Parcel Lines



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# APPENDICES

## Appendices:

- A. Resolution to initiate the AUAR process
- B. MN Department of Natural Resources (DNR) Correspondence
- C. State Historical Preservation Office (SHPO) Correspondence
- D. MN Department of Health (MDH) Correspondence
- E. Transportation, Air & Noise Analysis by SRF Consulting Group, Inc.
- F. Natural Resources Assessment Inventory
- G. Planning Principles & Urban Design Alternatives
- H. Parks & Open Space Plan
- I. Comments Received During 30-day Comment Period
- J. Response to Comments

**APPENDIX A.**  
**Resolution to Initiate the AUAR Process**



**A RESOLUTION OF THE CITY COUNCIL ORDERING THE PREPARATION OF AN  
ALTERNATIVE URBAN AREAWIDE REVIEW UNDER MN RULES 4410.3610 AND  
AUTHORIZING DISTRIBUTION FOR REVIEW AND COMMENT**

WHEREAS, the City of Mankato anticipates the development of land within a future growth area; and

WHEREAS, the future growth area is referred to as the Greater East Mankato Infill Service District (GEMISD); and

WHEREAS, the City has a Comprehensive Plan that includes the GEMISD and the Comprehensive Plan contains the following:

A. A land use plan designating the existing and proposed location, intensity, and extent of use of land and water for residential, commercial, industrial, agricultural, and other public and private purposes.

B. A public facilities plan describing the character, location, timing, sequence, function, use, and capacity of existing and future public facilities of the local governmental unit. The public facilities plan must include at least the following parts:

- (1) a transportation plan describing, designating, and scheduling the location, extent, function, and capacity of existing and proposed local public and private transportation facilities and services; and
- (2) a sewage collection system policy plan describing, designating, and scheduling the areas to be served by the public system, the existing and planned capacities of the public system, and the standards and conditions under which the installation of private sewage treatment systems will be permitted.

C. An implementation program describing public programs, fiscal devices, and other actions to be undertaken to implement the comprehensive plan. The implementation plan must include a description of official controls addressing the matters of zoning, subdivision, and private sewage treatment systems, a schedule for the implementation of those controls, and a capital improvements program for public facilities.

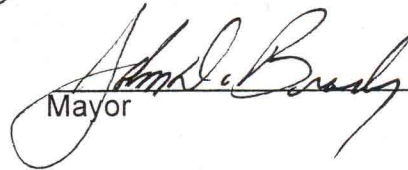
WHEREAS, Exhibit A depicts the location and specified boundary of the geographic area within which the review will apply in order to determine the impacts of proposed development and the mitigation of those impacts; and

WHEREAS, Exhibit B, C, and D depict anticipated development scenarios for the GEMISD which specifies the anticipated nature, location, and intensity of residential, commercial, warehousing, and light industrial development, and associated infrastructure within those boundaries, and Exhibit B is consistent with the adopted Land Use Plan, Exhibit C is an additional land use scenario, and Exhibit D is the preferred land use scenario; and

NOW, THEREFORE, BE IT RESOLVED by the Mankato City Council, that an Alternative Urban Areawide Review (AUAR) under Minnesota Rules 4410.3610 be undertaken for the Greater East Mankato Infill Service District area as depicted in Exhibit A and the AUAR be distributed for review and comment per Minnesota Rules.

This resolution shall become effective immediately upon its passage and without publication.

Passed this 22 day of January, 2007.

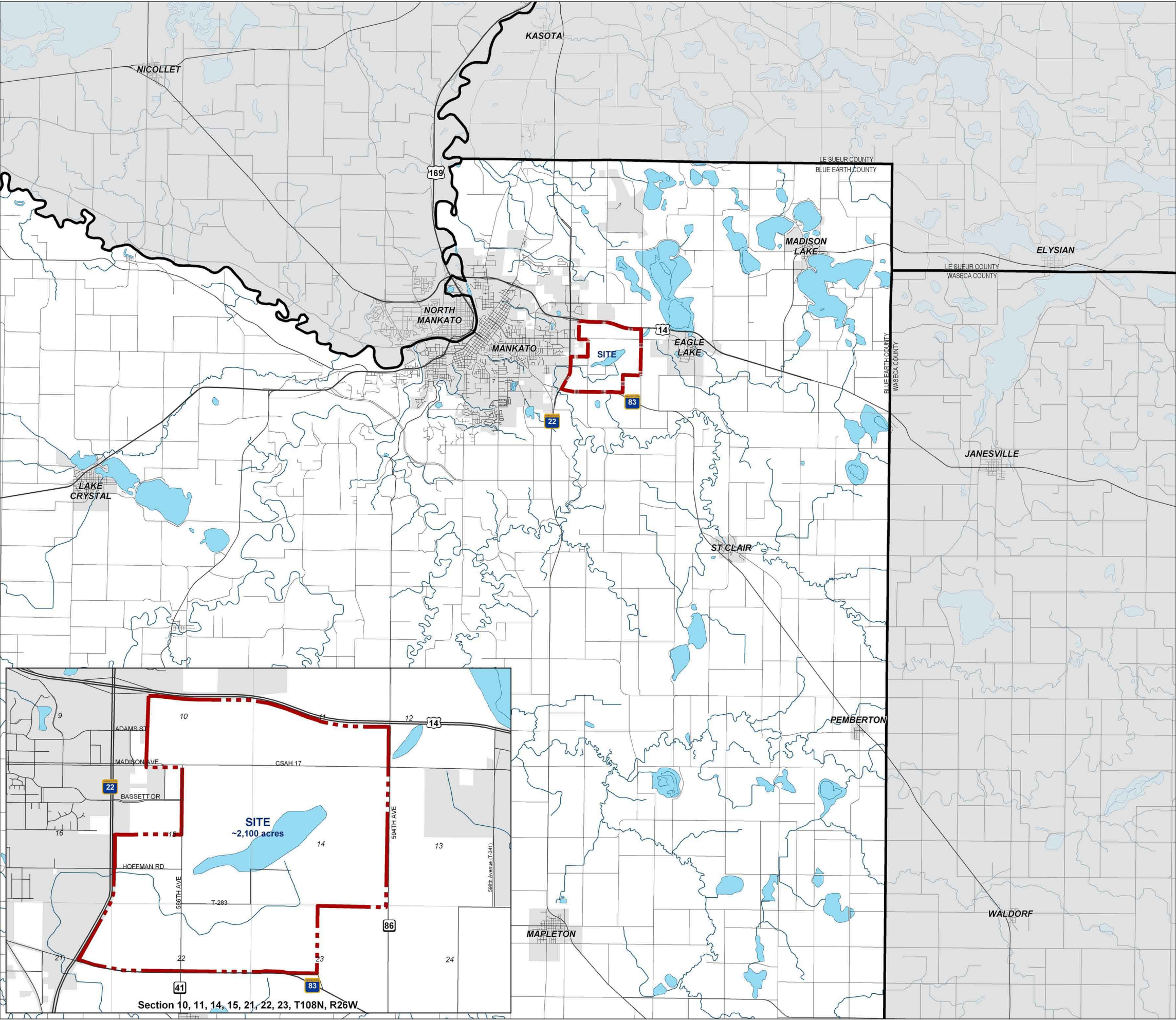
  
\_\_\_\_\_  
Mayor

Attest:   
\_\_\_\_\_  
City Clerk



LOCATION MAP

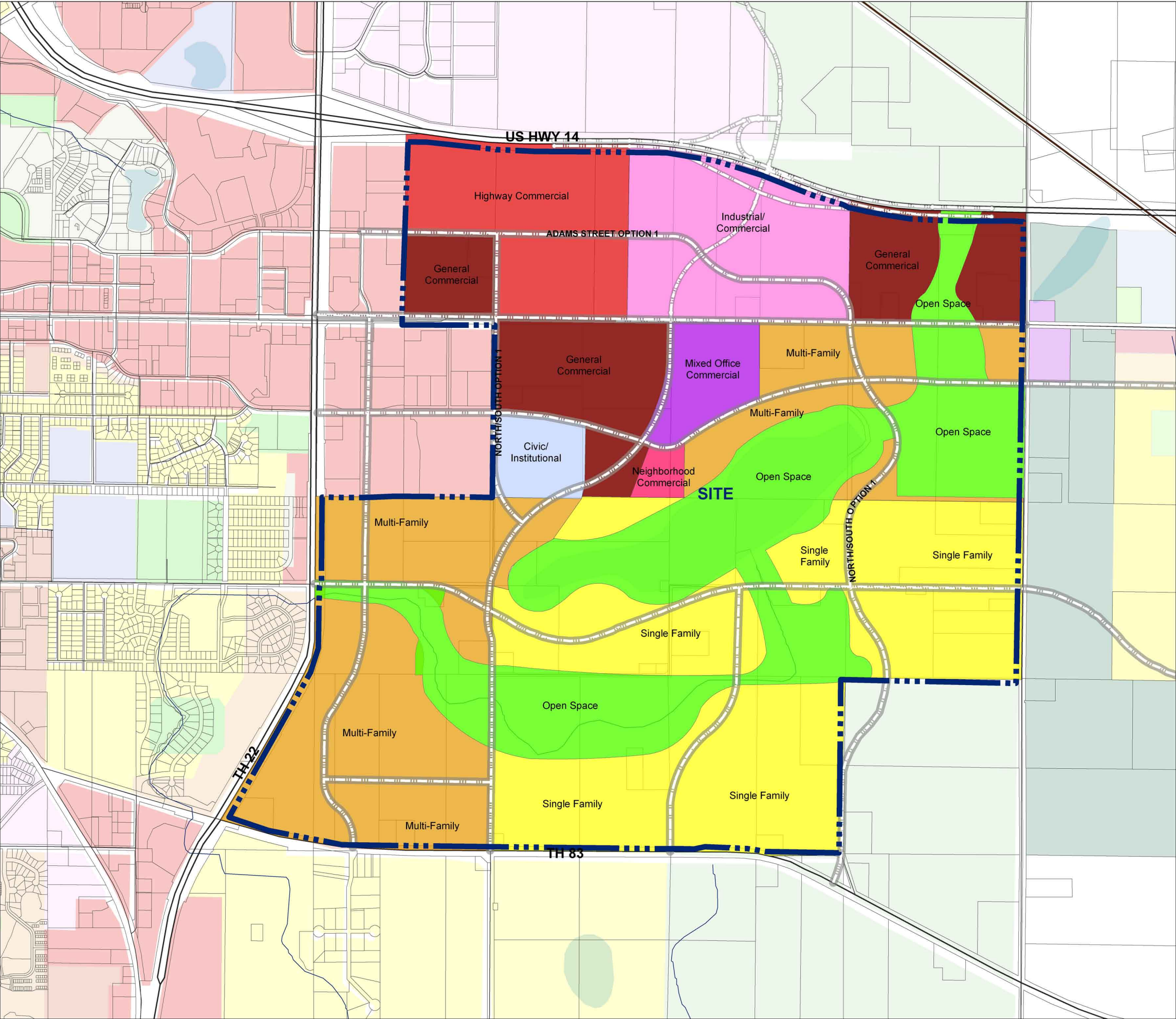
GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA





# SCENARIO A. FUTURE LAND USE MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

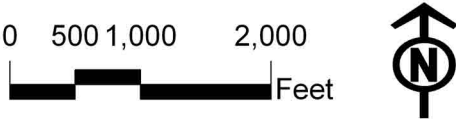


**LEGEND**

- AUAR Boundary
- Proposed Road & 120' ROW

**Scenario A Land Use**

- Single Family Residential
- Multi-Family Residential
- General Commercial
- Highway Commercial
- Neighborhood Commercial
- Industrial/Commercial
- Mixed Office Commercial
- Civic/Institutional
- Open Space

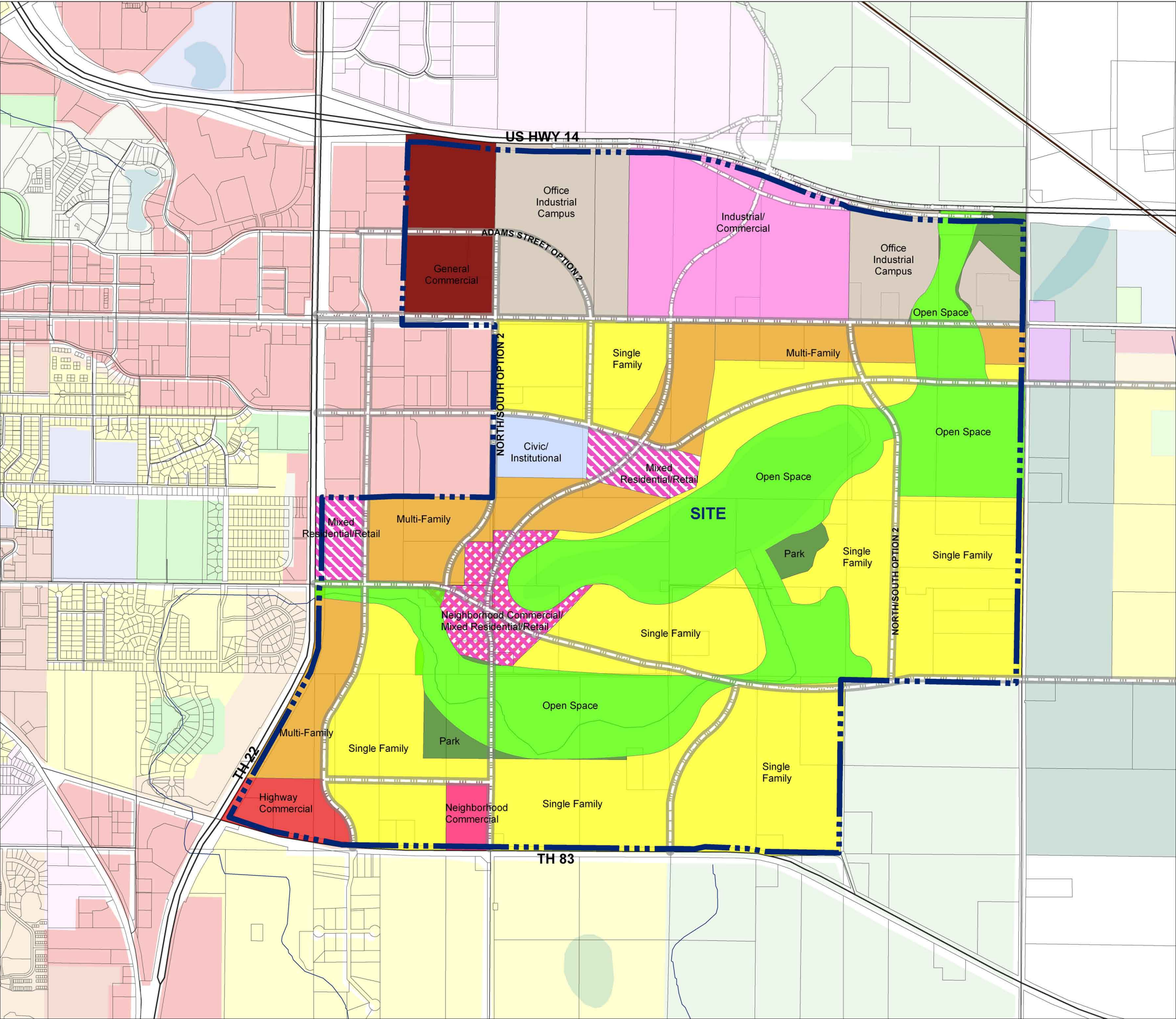


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# SCENARIO B. FUTURE LAND USE MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Proposed Road & 120' ROW
- Scenario B Land Use**
- Single Family Residential
- Multi-Family Residential
- General Commercial
- Highway Commercial
- Neighborhood Commercial
- Mixed Residential/Retail
- Neighborhood Commercial-Mixed Res/Retail
- Industrial/Commercial
- Office Industrial Campus
- Civic/Institutional
- Open Space
- Park

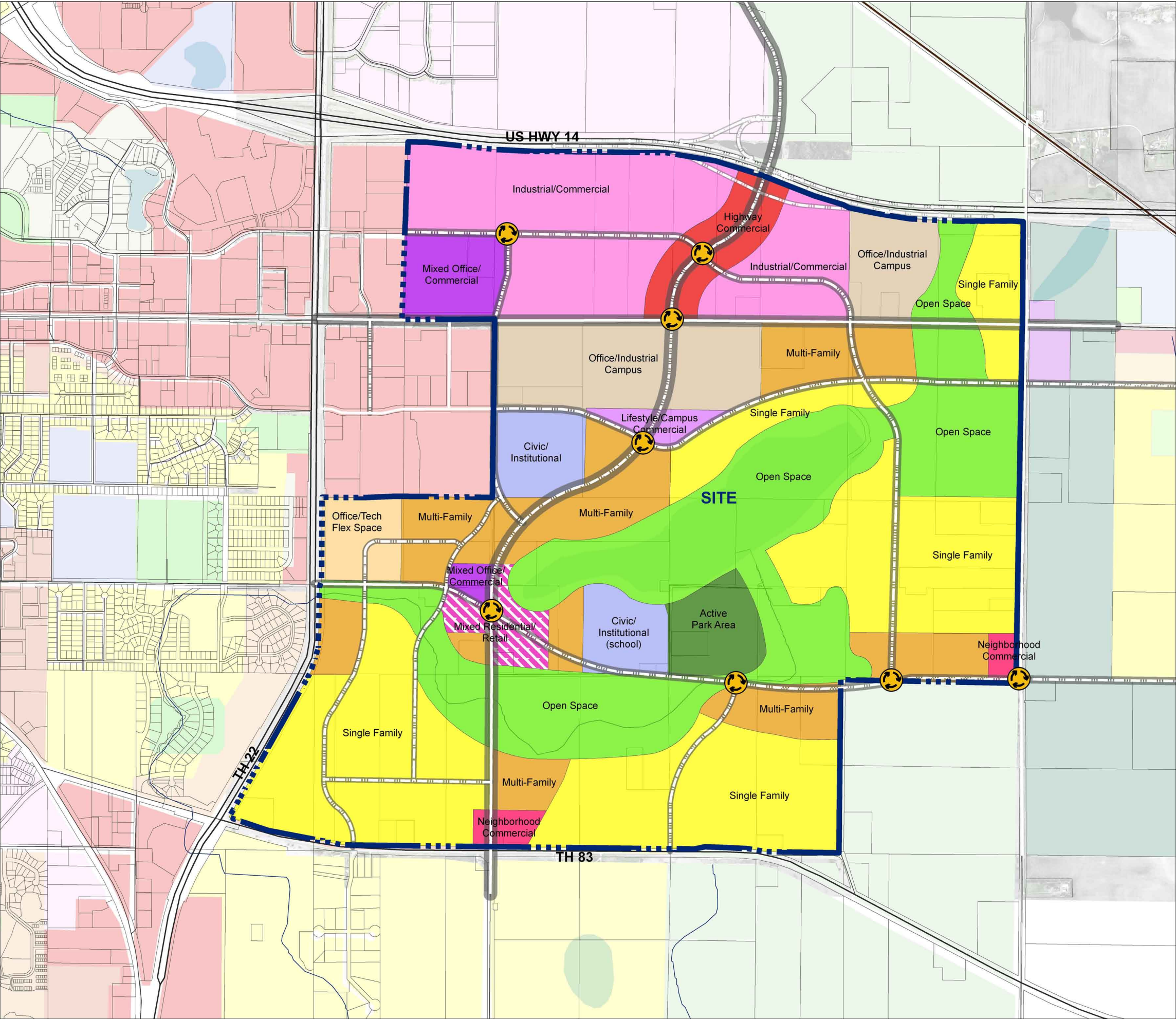


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# SCENARIO C. FUTURE LAND USE MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



**LEGEND**

- AUAR Boundary
- Proposed Road & Right-Of-Way
- Proposed Roundabout

**Scenario C Land Use**

- Single Family Residential
- Multi-Family Residential
- Highway Commercial
- Neighborhood Commercial
- Mixed Residential/Retail
- Industrial Commercial
- Lifestyle Center Commercial
- Mixed Office Commercial
- Office Industrial Campus
- Office/Tech Flex Space
- Civic/Institutional/School
- Open Space
- Active Park & Recreation Area



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**APPENDIX B.**  
**MN Department of Natural Resources (DNR) Correspondence**





## Minnesota Department of Natural Resources

Natural Heritage and Nongame Research Program, Box 25  
500 Lafayette Road

St. Paul, Minnesota 55155-40\_\_

Phone: (651) 259-5107 Fax: (651) 296-1811 E-mail: sarah.hoffmann@dnr.state.mn.us

May 26, 2006

Ms. Jamie Bender  
I&S Engineers & Architects, Inc.  
1409 Riverfront Drive  
Mankato, MN 56001

Re: Request for Natural Heritage information for vicinity of proposed Greater East Mankato Infill Service District; T108N R26W Sections 10, 11, 14, 15, 21, 22, & 23; Blue Earth County  
NHNRP Contact #: ERDB 20060898

Dear Ms. Bender,

The Minnesota Natural Heritage database has been reviewed to determine if any rare plant or animal species or other significant natural features are known to occur within an approximate one-mile radius of the area indicated on the map enclosed with your information request. Based on this review, there is 1 known occurrence of a rare species in the area searched (for details, see enclosed database printout and explanation of selected fields). However, based on the nature and location of the proposed project I do not believe it will affect any known occurrences of rare features.

The Natural Heritage database is maintained by the Natural Heritage and Nongame Research Program, a unit within the Division of Ecological Services, Department of Natural Resources. It is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding and protection of these features.

Because our information is not based on a comprehensive inventory, there may be rare or otherwise significant natural features in the state that are not represented in the database. A county-by-county survey of rare natural features is now underway, and has been completed for Blue Earth County. Our information about native plant communities is, therefore, quite thorough for that county. However, because survey work for rare plants and animals is less exhaustive, and because there has not been an on-site survey of all areas of the county, ecologically significant features for which we have no records may exist on the project area.

The enclosed results of the database search are provided in two formats: short record report and long record report. To control the release of locational information, which might result in the damage or destruction of a rare element, both printout formats are copyrighted.

The short record report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an Environmental Assessment Worksheet, municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the short record report for any other purpose, please contact me to request written permission. **The long record report includes more detailed locational information, and is for your personal use only. If you wish to reprint the long record report for any purpose, please contact me to request written permission.**

Please be aware that review by the Natural Heritage and Nongame Research Program focuses only on *rare natural features*. It does not constitute review or approval by the Department of Natural Resources as a whole. If you require further information on the environmental review process for other natural resource-related issues, you may contact your Regional Environmental Assessment Ecologist, Todd Kolander, at (507) 359-6073.

An invoice in the amount of \$71.94 will be mailed to you under separate cover within two weeks of  
DNR Information: 651-296-6157 • 1-888-646-6367 • TTY: 651-296-5484 • 1-800-657-3929



the date of this letter. You are being billed for map and database search and staff scientist review. Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

A handwritten signature in cursive script that reads "Lisa Joyal".

FOR Sarah D. Hoffmann  
Endangered Species Environmental Review Coordinator

encl: Database search results  
Rare Feature Database Print-Outs: An Explanation of Fields

Minnesota Natural Heritage & Nongame Research Program  
 Short Record Report of Element Occurrences within 1 mile radius of:  
 Greater East Mankato Infill Service District AUAR  
 T108N R26W Sections 10, 11, 14, 15, 21, 22, & 23  
 Blue Earth County

| Element Name and Occurrence Number | Federal Status | MN Status | State Rank | Global Rank | Last Observed Date |
|------------------------------------|----------------|-----------|------------|-------------|--------------------|
|------------------------------------|----------------|-----------|------------|-------------|--------------------|

Blue Earth County, MN

Spilogale putorius (Eastern Spotted Skunk) #8

Location Description: T108N R26W S21, T108N R26W S28

|  |  |     |    |    |          |
|--|--|-----|----|----|----------|
|  |  | THR | S2 | G5 | 1968-12- |
|--|--|-----|----|----|----------|

Records Printed = 1



**APPENDIX C.**  
**State Historical Preservation Office (SHPO) Correspondence**

**Jamie Bender**

---

**From:** Cinadr, Thomas [thomas.cinadr@mnhs.org]  
**Sent:** Monday, May 15, 2006 8:13 AM  
**To:** Jamie Bender  
**Subject:** RE: Database search: Archaeological & Architecture/History  
**Attachments:** Archaeology.doc; Historic.doc

Archaeological sites and historic properties were identified in a search of the Minnesota Archaeological Inventory and Historic Structures Inventory for the search area requested. Reports containing the results of the search are attached.

The result of this database search provides a listing of recorded archaeological sites and historic architectural properties that are included in the current SHPO databases. Because the majority of archaeological sites in the state and many historic architectural properties have not been recorded, important sites or structures may exist within the search area and may be affected by development projects within that area. Additional research, including field survey, may be necessary to adequately assess the area's potential to contain historic properties.

With regard to Environmental Assessment Worksheets (EAW), a negative known site/structure response from the SHPO databases is not necessarily appropriate information on which to base a "No" response to EAW Question 25a. It is the Responsible Governmental Unit's (RGU) obligation to verify the accuracy of the information contained within the EAW. A "No" response to Question 25a without written justification should be carefully considered.

If you require a comprehensive assessment of a project's potential to impact archaeological sites or historic architectural properties, you may need to hire a qualified archaeologist and/or historian. Please contact the SHPO by phone at 651-296-5462 or by email at [mnshpo@mnhs.org](mailto:mnshpo@mnhs.org) for current lists of professional consultants in these fields.

The Minnesota SHPO Survey Manuals and Database Metadata can be found at <http://www.mnhs.org/shpo/survey/inventories.htm>

*Tom Cinadr*

Survey and Information Management Coordinator  
Minnesota State Historic Preservation Office  
Minnesota Historical Society  
345 Kellogg Blvd. West  
St. Paul, MN 55102

651-205-4197 (voice)  
651-282-2374 (fax)

-----Original Message-----

**From:** Jamie Bender [mailto:[jamieb@is-ea.com](mailto:jamieb@is-ea.com)]  
**Sent:** Wednesday, May 10, 2006 9:50 AM

**To:** Cinadr, Thomas

**Subject:** Database search: Archaeological & Architecture/History

Tom,

We are completing an Alternative Urban Areawide Review (AUAR) for an area in Mankato, MN. The project is called 'Greater East Mankato Infill Service District'. As part of this, I need your assistance to complete a site search of the MN SHPO Archaeological Database and the MN SHPO Architecture/History Database for information in the project area. The site is approximately 2,100 acres and is in the following sections: S 1/2 of section 10 & 11, section 14 & 15, NE 1/4 of section 21, N 1/2 of section 22, NW 1/4 section 23, all within Township 108N, Range 26W ( Mankato Township, Blue Earth County, Minnesota). The site is located just east of the Mankato city limits and west of Eagle Lake and is predominantly agricultural land. I have attached a map of the site in PDF format. Please let me know if you have any questions or if I can provide you with any more information to help complete this request.

Thank you for your assistance!

Sincerely,

Jamie Bender  
Natural Resources Management  
I&S Engineers & Architects, Inc.

1409 N. Riverfront Drive  
Mankato, MN 56001  
p: 507.387.6651  
f: 507.387.3583  
c: 507.327.5418  
email: jamieb@is-ea.com  
web: www.is-ea.com

25 NW 4th St, Suite 105  
Faribault, Minnesota 55021  
507.331.1500 Office  
507.331.1501 Fax

# History/Architecture

| PROPERTY NAME                  | ADDRESS  | Twp | Range | Sec | Quarters | USGS         | Report   | NRHP | CEF | DOE | Inventory Number |
|--------------------------------|--|-----|-------|-----|----------|--------------|----------|------|-----|-----|------------------|
| COUNTY                         | Blue Earth                                     |     |       |     |          |              |          |      |     |     |                  |
| CITY/TOWNSHIP:                 | Mankato  |     |       |     |          |              |          |      |     |     |                  |
| Lincoln Park Historic District | vicinity Shaubut St., Record St., and Pleasant | 108 | 26    | 13  | E-SE     | Mankato West | BE-94-2H |      | Y   |     | BE-MKC-400       |
| CITY/TOWNSHIP:                 | Mankato Twp.                                   |     |       |     |          |              |          |      |     |     |                  |
| Scheuer Farmstead              | off Co. Hwy. 3                                 | 108 | 26    | 11  | SW-NE-NW | Mankato East | BE-95-2H |      |     |     | BE-MKT-027       |
| farmhouse                      |  | 108 | 26    | 10  | NE-NE-NE | Mankato East | BE-95-2H |      |     |     | BE-MKT-028       |
| District School No. 55         |  | 108 | 26    | 11  | NW-NW-N  | Mankato East | BE-95-2H |      |     |     | BE-MKT-030       |

# Archaeological Site Locations

| Site Number               | Site Name            | Twp. | Range | Sec. | Quarter Sections | Acres | Phase | Site Description | Traditio | Context | Reports   | NR | CEF | DOE |
|---------------------------|----------------------|------|-------|------|------------------|-------|-------|------------------|----------|---------|-----------|----|-----|-----|
| <b>County: Blue Earth</b> |                      |      |       |      |                  |       |       |                  |          |         |           |    |     |     |
| 21BE0072                  | Bartsch              | 108  | 26    | 21   | C-S-S-NE         | 4     | 1     | LS               |          |         | THY-88-01 |    |     |     |
| 21BEy                     | Dickerson/White Star | 108  | 26    | 22   | SE               | 0     | 7     | HD               |          |         |           |    |     |     |

**APPENDIX D.**  
**MN Department of Health (MDH) Correspondence**

## Jamie Bender

---

**From:** Terry Bovee [Terry.Bovee@state.mn.us]  
**Sent:** Thursday, October 05, 2006 9:31 AM  
**To:** Jamie Bender  
**Cc:** Art Persons; Rhonda Johnson  
**Subject:** Re: Requesting water supply information - Greater East MankatoInfill Service District

Jamie,

I have reviewed the enclosed map with MDH-Mankato Community and Noncommunity drinking water staff. There is one 'transient noncommunity' public water supplier within the boundaries of your study area. That would be the radio station KTOE located in the extreme SE corner of Section 11, T108N, R26W (on old highway 14). On the opposite corner from KTOE is the natural gas pumping station, they too are a transient public water supplier but are outside your area of interest.

There are no community or nontransient-noncommunity public water supply systems in the study area.

The 'wellhead protection area' for transient public water suppliers consists of a 200 foot radius around the well. Within this radius, setbacks to potential contaminant sources (sewage pipes, tanks, septic systems, etc.) that the state well code addresses must be met.

If you have any additional questions please contact me.

Terry

Terry L. Bovee  
MN. Dept. Of Health  
Source Water Protection Unit  
410 Jackson, Suite 500  
Mankato, MN 56001  
tel. 507-389-6597  
fax 507-389-5563  
terry.bovee@health.state.mn.us

>>> "Jamie Bender" <jamieb@is-ea.com> 10/5/2006 8:15 AM >>>  
<<9293 location map.pdf>> Terry,

We are doing an environmental review for a project located east of Mankato in Mankato Township (T108N, R26W), Blue Earth County, MN. I am hoping you could tell me if there are any Drinking Water Supply Management Areas or Public Supply Wells in proximity to the proposed location (Sections 10, 11, 14, 15, 21, 22 and 23)? I have enclosed a map showing the location of the Project as a pdf file. If you have any questions, I can be reached by email or phone. Thanks for your help!

Jamie Bender  
Natural Resources Management  
I&S Engineers & Architects, Inc.

1409 N Riverfront Drive  
Mankato, MN 56001  
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**APPENDIX E.**  
**Transportation, Air & Noise Analysis by SRF Consulting, Inc.**



## DRAFT MEMORANDUM

TO: Doug Losee, I & S Engineers and Architects, Inc.

CC: Paul Vogel, Community Development Director, City of Mankato  
Ken Saffert, P.E., Engineer, City of Mankato  
Al Forsberg, P.E., Engineer, Blue Earth County  
Lisa Bigham, Mn/DOT

FROM: Mary Karlsson, P.E., Senior Transportation Engineer  
Jordan Mancl, Traffic Engineer

DATE: December 7, 2006

SUBJECT: Mankato East Alternative Urban Areawide Review (AUAR)  
Traffic Study

## INTRODUCTION

SRF Consulting Group, Inc. conducted a traffic study as part of the Mankato East AUAR to aid the City of Mankato in planning for future infrastructure in the city's eastern region as shown in Figure 1. This AUAR presents the traffic-related impacts of future development in this part of the city and identifies the transportation infrastructure necessary to support these developments.

The Mankato East AUAR traffic study analyzed PM peak hour traffic conditions under existing (2006) conditions and under the future build-out conditions listed below. The City views the future build-out condition as the City's long range plan for this area and anticipates that these conditions may be reached within the next 50 years. The analysis focused on the PM peak hour because of the substantial amount of commercial land use anticipated in the area (the PM peak hour is the worst case scenario for these conditions).

- Existing (2006) Conditions
- Future Build-Out Year without AUAR development
- Future Build-Out Year with AUAR development

The land uses included in the AUAR development are summarized in Table 1 and illustrated in Figure 2.

One Carlson Parkway North, Suite 150, Minneapolis, MN 55447-4443  
Telephone (612) 475-0010 ☐ Fax (612) 475-2429 ☐ <http://www.srfconsulting.com>

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Figure 1 – Study Area



Figure 2  
Planned Future Land Use

**Table 1**  
**2006 AUAR Build-Out Land Use Summary**

| <b>FUTURE LAND USE TYPE</b> | <b>ACRES</b> |
|-----------------------------|--------------|
| Commercial                  | 129          |
| Industrial                  | 249          |
| Office                      | 295          |
| Single Family Residential   | 600          |
| Multi-Family Residential    | 283          |

## **EXISTING CONDITIONS**

To understand how the existing transportation system operates in the study area, the study team analyzed existing traffic conditions within the study area. Figure 3 illustrates existing geometrics, traffic controls, and PM peak hour traffic volumes that were collected in June 2006 at the following key intersections:

- TH 22 and County State Aid Highway 3 (CSAH 3)
- TH 22 and TH 14 North Ramp
- TH 22 and TH 14 South Ramp
- TH 22 and Adams Street
- TH 22 and Madison Ave. (CSAH 17)
- TH 22 and Bassett Drive
- TH 22 and Hoffman Road
- TH 22 and TH 83
- County Road 86 and Madison Ave. (CSAH 17)
- County Road 86 and TH 83

An operations analysis was conducted for the PM peak hour at each of the key intersections to determine how traffic currently operates within the project area. All signalized intersections were analyzed using Synchro/SimTraffic software, unsignalized intersections were analyzed using Highway Capacity Software. Operations analysis results identify a Level of Service (LOS), which indicates how well an intersection is operating. The LOS results are based on average delay per vehicle. Intersections are given a ranking from LOS A through LOS F. Level of Service A indicates the best traffic operation and LOS F indicates an intersection where demand exceeds capacity. LOS A through D is generally considered acceptable by drivers.

For the analysis of side-street stop controlled intersections, the operations can be described in two ways. In Table 2, the intersections with two levels of service indicate side-street stop controlled intersections. The first level of service shown is the overall intersection level of service, which provides the average delay per vehicle for all approaches. However, it is important to note that at an intersection with side-street stop control, traffic on the major street does not stop and the majority of delay is experienced by vehicles that are stopped on the side street. To reflect this condition, level of service is reported for both the overall intersection and the side-street approaches. It is typical of intersections with higher mainline traffic

Figure 3  
Existing Conditions and PM Peak Hour Volumes



volumes to experience high levels of delay (poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during the peak periods.

Results of the analysis shown in Table 2 indicate that the intersections are currently operating at an acceptable overall LOS C or better in the PM peak hour, with existing traffic controls and geometric layout.

**Table 2**  
**Level of Service Results for Existing Conditions**

| <b>INTERSECTION</b>  | <b>PM PEAK LOS</b> |
|--|--------------------|
| TH 22 and CSAH 3   | B                  |
| TH 22 and TH 14 North Ramp                                 | A                  |
| TH 22 and TH 14 South Ramp                                 | A                  |
| TH 22 and Adams Street                                     | C                  |
| TH 22 and Madison Avenue                                   | C                  |
| TH 22 and Bassett Drive                                    | C                  |
| TH 22 and Hoffman Road                                     | B                  |
| TH 22 and TH 83  | C                  |
| County Road 86 and CSAH 17 (Madison Avenue) <sup>(1)</sup> | C/C (EB)           |
| County Road 86 and TH 83 <sup>(1)</sup>                    | B/C (EB)           |

Notes

(1) Unsignalized intersection. The level of service for the overall intersection is shown followed by the worst level of service on the stopped side streets. The worst side street approach is denoted in parenthesis (e.g., EB = Eastbound approach).

## **FUTURE BUILD-OUT ANALYSIS**

The purpose of an AUAR traffic study is to test the impact of the land use scenario and develop strategies to mitigate its impact. To isolate the effects of the AUAR development, the study analyzed future traffic conditions with and without development in the AUAR area, since the land use assumed outside the AUAR area is substantial.

The study used the background development, AUAR land use assumptions, and Institute of Transportation Engineers (ITE) trip generation rates to develop trip generation estimates for the PM peak hour for each area of development. The added trips were used along with existing travel patterns (as shown in Figure 4) in Traffix software to develop turn movements at the study intersections. Once turning movements were produced at each intersection, some adjustments were made to volumes to balance between the TH 14/TH 22 interchange and the TH 14/CSAH 12 interchange. Volumes were also adjusted to account for balancing between several left/right turning movements along TH 22. The final turning movements were put into a Synchro/SimTraffic model for operations analysis.

Table 3 summarizes the Future Build-Out land use assumptions. The number of peak hour trips generated by the entire study area (inside and outside the AUAR are) range from 35 to 40 percent higher compared to trips generated by the 2005 Northeast Mankato AUAR Traffic Study.

Figure 4  
Directional Distribution

Table 3  
Build-Out Land Use Summary

## **Assumed Roadway Improvements and Results of Build-Out Analysis**

### Future Base Road Network

The future land use assumed outside of the AUAR area is consistent with the 2005 Northeast Mankato AUAR assumptions. Because of these substantial growth assumptions, the study team assumed that a roadway network would be added parallel to TH 22 to relieve congested intersections. Figure 5 shows that added roadways include the following (light-weight dashed lines):

- CSAH 12 extension from Madison Avenue to north of CSAH 3
- TH 14/CSAH 12 interchange
- CR 86 Overpass at TH 14

These improvements are consistent with the base roadway network assumed in the 2005 Northeast Mankato AUAR traffic study. All intersections analyzed on the new CSAH 12 corridor were assumed to be side-street stop controlled. Figure 5 shows the following intersections were added to the analysis:

- CSAH 12 and Madison Avenue
- CSAH 12 and TH 14 South Ramps
- CSAH 12 and TH 14 North Ramps

Even with these improvements, Table 4 shows that the Base Network roadway system is not capable of supporting even the background development as most analyzed intersections on TH 22 operate at LOS E.

### Recommended 2005 Northeast Mankato AUAR Roadway Improvements

Because several intersections operated poorly with the base roadway network, the study team identified initial improvements to the roadway geometrics and signal phasing needed to support the background growth. Figure 6 illustrates the geometric improvements required to address the majority of the operational problems caused by growth outside the AUAR area. In addition to these geometric improvements, overlapping right turn signal phasing (the right turn receives a green arrow at the same time as a complimentary left turn) was added to all signalized intersections along the TH 22 Corridor with the exception of the TH 14 Ramp intersections.

With these improvements, Table 4 shows that all intersections operate at LOS D if there is no development in the AUAR area.

### 2006 AUAR Build-Out Network

Before analyzing the roadway network with traffic produced by the 2006 AUAR study area's development, the study team extended several roadways. Figure 5 shows the key roadways include the following (heavy dashed lines):



Figure 5  
Analyzed Intersections

Table 4  
Build-Out Intersection Level of Service Results

Figure 6  
Future Improvements Needed without AUAR Development

- CSAH 12 extension from Madison Avenue to TH 83 (four lanes with turn lanes at intersections)
- 586th Street from Adams Street to CSAH 12 (two lanes with turn lanes)
- Bassett Drive extension from east of TH 22 to east of CR 86 (two lanes with turn lanes)
- Hoffman Road extension from east of TH 22 to east of CR 86 (four lanes with turn lanes to CSAH 12, two lanes with turn lanes east of CSAH 12)
- Adams Street extension from east of TH 22 to Hoffman Road (four lanes with turn lanes from east of TH 22 to Madison Avenue, two lanes with turn lanes from Madison Avenue to Hoffman Road)

Figure 5 also shows the following intersections were added to the analysis:

- CSAH 17 and 586th Street
- CSAH 12 and Hoffman Road
- CSAH 12 and TH 83
- CSAH 12 and Bassett Drive
- CSAH 12 and Adams Street
- CSAH 17 and Adams Street
- Hoffman Road and CR 86

With this network, Table 4 shows several intersections operate at LOS E or F including the following intersections: TH 22/CSAH 3, TH 22/Adams Street, TH 22/Madison Avenue, CSAH 12/Basset Drive, CSAH 12/Madison Avenue, and Madison Avenue/Adams Street, and the TH 14 interchange ramps.

#### Recommended 2006 AUAR Build-Out Final Roadway Improvements

To accommodate the additional traffic generated by the AUAR development, the study team analyzed additional roadway improvements beyond those initially added. Figure 7 shows the identified improvements were:

- Madison Avenue - four lanes with turn lanes are needed from CSAH 12 to CR 86
- TH 83 - four lanes with turn lanes are needed from west of TH 22 to CSAH 12
- Dual left turn lanes were also added at several intersections along TH 22 and CSAH 12.

With the final improvements, Table 5 shows that all intersections performed at acceptable LOS D or better.



Figure 7 – Future improves needed with AUAR Development

## FINDINGS AND RECOMMENDATIONS

1. Under Build-Out development conditions, development in the AUAR area generates 8,673 trips in the PM peak hour. The AUAR development trips comprise 50 percent of the total number of PM peak hour trips. Together, the AUAR and background growth in trips are 35 to 40 percent higher than the trips generated in the Northeast Mankato AUAR Traffic Study.
2. With background growth only and no development in the AUAR area, Table 6 shows improvements are needed on the roadway network. Improvements include 6 lanes on TH 22, 4 lanes on Adams Street as it approaches TH 22, and extending 4 lanes on CSAH 3 and Madison Avenue to the CSAH 12 extension.
3. The roadway network would be extended to provide access in the AUAR area. The study results confirmed the following:
  - *At least* 200 feet of right-of-way should be preserved for the CSAH 12 extension, and it should be constructed with four lanes (i.e., two through lanes in each direction) and turn lanes at intersections.
  - Four travel lanes (i.e., two through lanes in each direction) with turn lanes are needed on Adams Street and Hoffman Road from TH 22 to CSAH 12.
  - Table 6 shows the extended network should also include more capacity than initially planned. Four through lanes with turn lanes at intersections are also needed on Madison Avenue and TH 83. Dual left turn lanes are needed at several intersections as well.
4. The City of Mankato, Blue Earth County, and the Minnesota Department of Transportation should work together to preserve right-of-way in and limit access to the CSAH 3, CSAH 12, Madison Avenue, TH 22, and TH 83 corridors. These roadways are anticipated to have high traffic demands and serve important roles in the network. Their importance will continue to increase as the Mankato area continues to develop.

**Table 6**  
**Summary of Roadway Improvements**

| Improvements   | No AUAR Development <sup>(1)</sup> | AUAR Development <sup>(2)</sup> | 2005 NE Mankato AUAR Findings <sup>(3)</sup> |
|--|------------------------------------|---------------------------------|--|
| <i>Improvements to Existing Road Network</i>   |                                    |                                 |  |
| A. Six-lane TH 22 (Hoffman Rd. to north of CSAH 3)   | ✓                                  | ✓                               | ✓<br>Bassett Drive to north of CSAH 3        |
| B. Four-lane Madison Avenue with turn lanes  |                                    |                                 |  |
| ▪ TH 22 to CSAH 12   | ✓                                  | ✓                               | ✓  |
| ▪ CSAH 12 to CR 86   |                                    | ✓                               |  |
| C. Four-lane Adams Street  |                                    |                                 |  |
| ▪ Immediately west and east of TH 22   | ✓                                  | ✓                               | ✓  |
| D. Four-lane CSAH 3 (Excel to CSAH 12) with turn lanes                                       | ✓                                  | ✓                               | ✓  |
| E. Left turn lane with right turn lanes for:   |                                    |                                 |  |
| ▪ West approach of TH 22/TH 83 intersection  | ✓                                  | ✓<br>(Dual left)                |  |
| ▪ East approach of TH 22/TH 83 intersection  |                                    | ✓                               |  |
| F. Dual left turn lanes with right turn lanes for:   |                                    |                                 |  |
| ▪ East approach at TH 22/CSAH 3 intersection   | ✓                                  | ✓                               | ✓<br>All Approaches                          |
| ▪ All approaches but south approach at TH 22/Adams Street                                    | ✓                                  | ✓                               | ✓<br>All Approaches                          |
| ▪ West approach at TH 22/Madison Ave intersection  | ✓                                  | ✓                               | ✓  |
| ▪ All other approaches (north, south, and east) at TH 22/Madison Ave intersection            |                                    | ✓                               | ✓  |
| ▪ West approach at TH 22/Hoffman Road intersection   |                                    | ✓                               |  |
| ▪ West approach at TH 22/CSAH 3 intersection   |                                    | ✓                               | ✓<br>All Approaches                          |
| G. Four-lane TH 83 (west of TH 22 to CSAH 12)  |                                    | ✓                               |  |
| H. Channelized Yield Right at TH 14 South Ramp/TH 22 intersection                            |                                    | ✓                               |  |
| I. Signalize the Madison Avenue/CR 86 intersection and add left turn lanes at all approaches | ✓                                  | ✓                               |  |

*Continued on next page ...*

**Table 6**  
**Summary of Roadway Improvements, Continued...**

| Improvements   | No AUAR Development<br>(1) | AUAR Development<br>(2) | 2005 NE Mankato AUAR Findings (3) |
|--|----------------------------|-------------------------|-----------------------------------|
| <i>Improvements to Existing Road Network</i>   |                            |                         |                                   |
| J. Overlapping right turn signal phasing for all intersection approaches at:           |                            |                         |                                   |
| ▪ TH 22/CSAH 3   | ✓                          | ✓                       | ✓<br>West Approach Only           |
| ▪ TH 22/Adams Street   | ✓                          | ✓                       | ✓<br>East Approach Only           |
| ▪ TH 22/ Madison Avenue  | ✓                          | ✓                       | ✓<br>East Approach Only           |
| ▪ TH 22/Bassett Drive  | ✓                          | ✓                       | ✓<br>East Approach Only           |
| ▪ TH 22/Hoffman Road   | ✓                          | ✓                       |                                   |
| ▪ TH 22/TH 83  | ✓                          | ✓                       |                                   |
| <i>Improvements to Extended Road Network (Improvements beyond Initial Assumptions)</i> |                            |                         |                                   |
| K. Dual left turn lanes with right turn lanes for:                                     |                            |                         |                                   |
| ▪ North, south, and west approaches at Madison Avenue/CSAH 12 intersection             | n/a                        | ✓                       | n/a                               |
| ▪ South approach at TH 14/CSAH 12 North Ramp   | n/a                        | ✓                       | n/a                               |
| ▪ East approach at TH 14/CSAH 12 South Ramp  | n/a                        | ✓                       | n/a                               |
| ▪ North and West approaches at CSAH 12/Bassett Drive intersection                      | n/a                        | ✓                       | n/a                               |
| L. Overlapping right turn signal phasing for all intersection approaches at:           |                            |                         |                                   |
| ▪ Madison Avenue/586th Street  | n/a                        | ✓                       | n/a                               |
| ▪ CSAH 12/Hoffman Road   | n/a                        | ✓                       | n/a                               |
| ▪ CSAH 12/Bassett Drive  | n/a                        | ✓                       | n/a                               |
| ▪ CSAH 12/Madison Avenue   | n/a                        | ✓                       | n/a                               |
| ▪ CSAH 12/Adams Street   | n/a                        | ✓                       | n/a                               |
| ▪ Madison Avenue/Adams Street  | n/a                        | ✓                       | n/a                               |

(1) Check indicates improvement needed to address development outside the AUAR area.

(2) Shaded cell with check indicates improvement needed to address AUAR development.

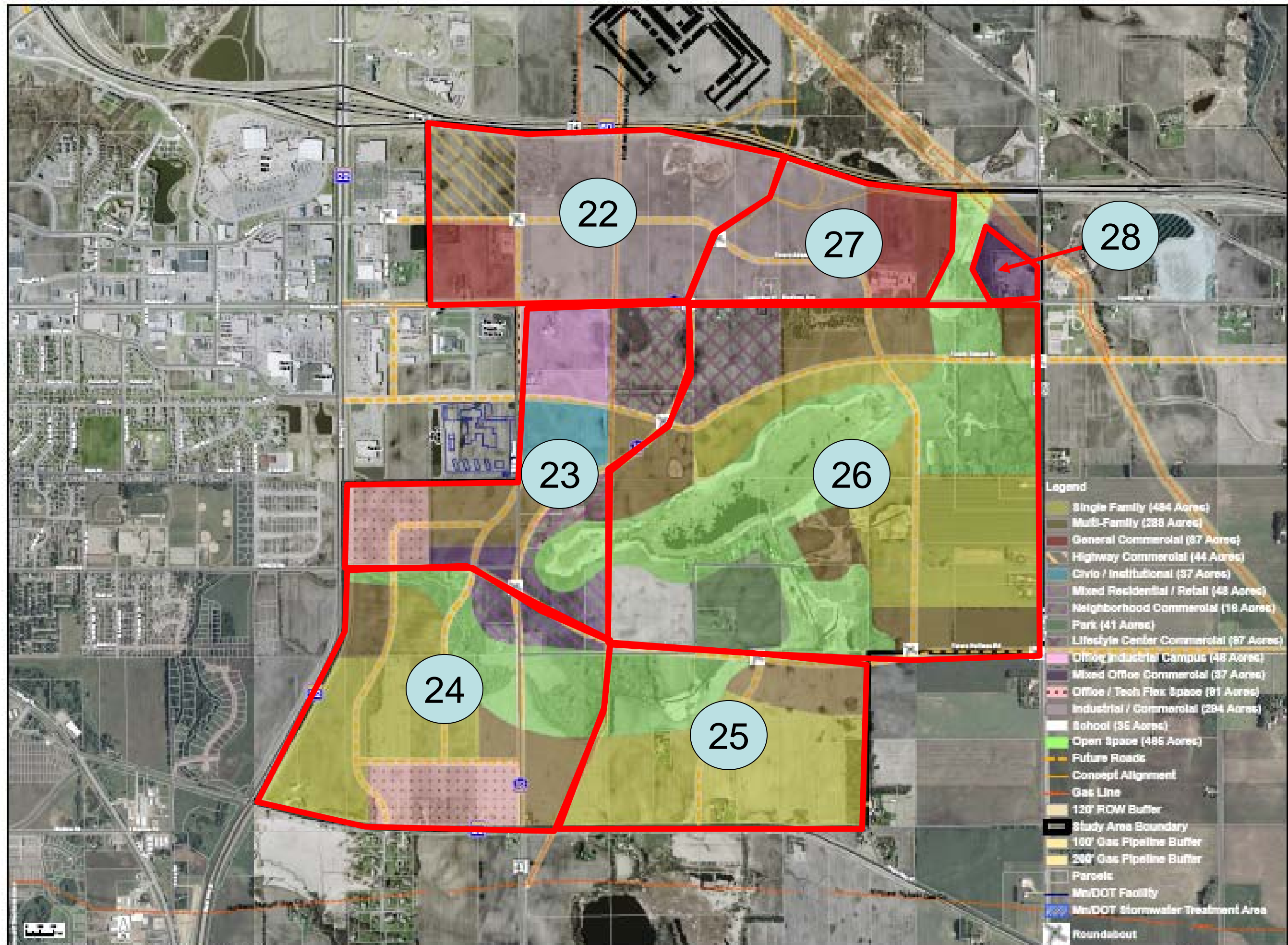
(3) Check indicates consistency with 2005 Northeast Mankato AUAR Traffic Study. Included for comparison purposes only.

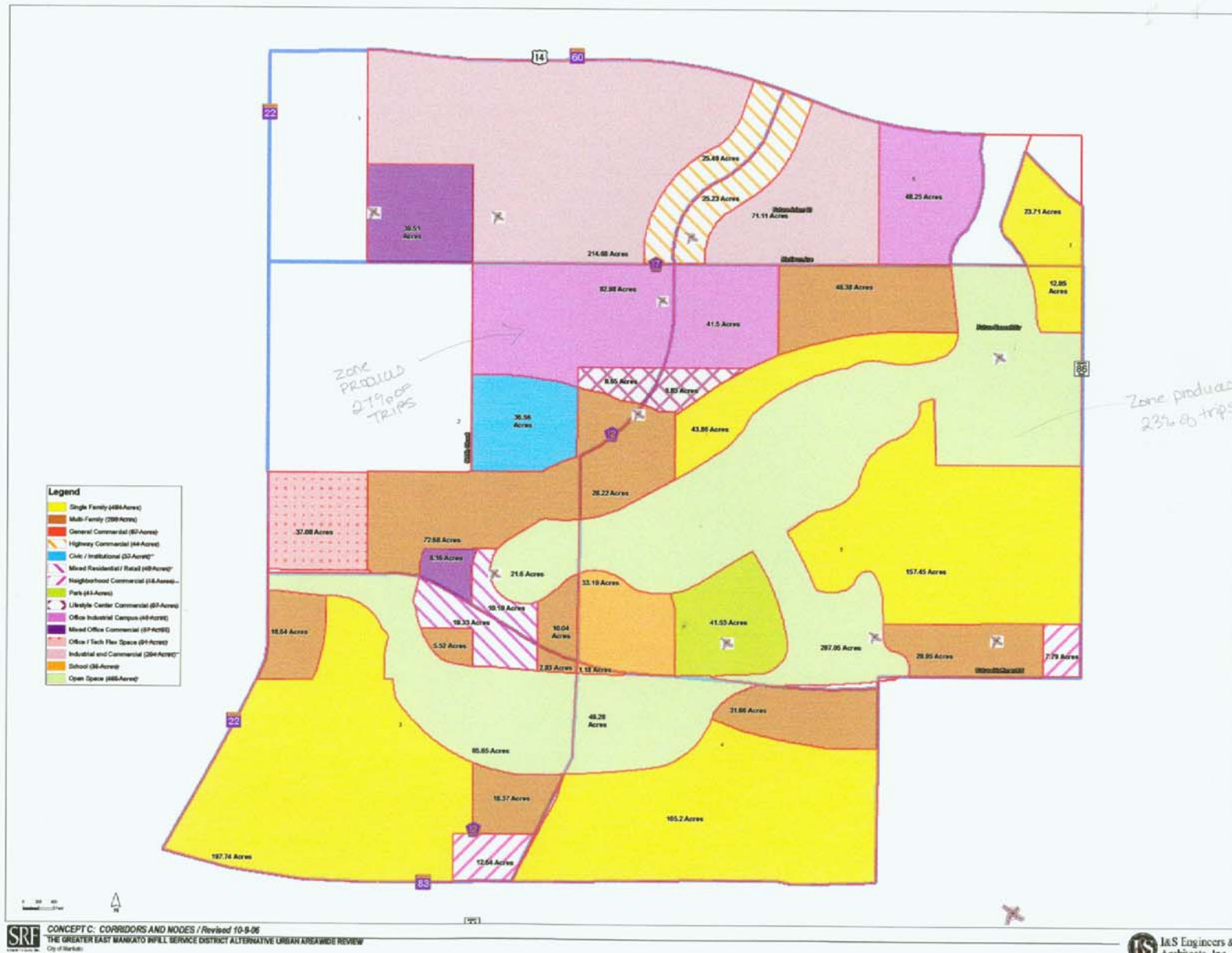


## **Appendix A**

### **Land Use Assumptions and Resulting Build Out Year PM Peak Hour Turn Movement Volumes**

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MANKATO EAST AUAR Study - 2030 Analysis

10/27/2006

TABLE A.2  
2030 SCENARIO A FUTURE LAND USE ANALYSIS (ESTIMATED AREA AND TRIPS)<sup>(1)</sup>

| Traffic Zone Number | Development Type <sup>(3), (4), (5), (8), (9)</sup> | mi <sup>2</sup> | Estimated Acreage | Reduced Estimated Acreage <sup>(11)</sup> | Estimated Square Footage | Percent Developed <sup>(6)</sup> | Reduced Square Footage | Floor Area Ratio (FAR) | Floor Area (sf) or # of Units | Total Generated PM Peak Hour Trips | Reduced Generated PM Peak Hour Trips <sup>(7)</sup> | PM In (vph) | PM Out (vph) | ITE Land Use      |
|---------------------|---|-----------------|-------------------|---|--------------------------|----------------------------------|------------------------|------------------------|-------------------------------|------------------------------------|---|-------------|--------------|-------------------|
| 22                  | Highway Commercial                                  | 0.1             | 25                | 18  | 762,300                  | 100%                             | 762,300                | 0.15                   | 114,345                       | 684                                | 410   | 259         | 152          | Shopping Center   |
| 22                  | Mixed Office  | 0.1             | 20                | 14  | 609,840                  | 100%                             | 609,840                | 0.2                    | 121,968                       | 215                                | 215   | 136         | 80           | Office            |
| 22                  | Mixed Commercial                                    | 0.1             | 20                | 14  | 609,840                  | 100%                             | 609,840                | 0.2                    | 121,968                       | 714                                | 428   | 270         | 158          | Shopping Center   |
| 22                  | Warehousing <sup>(10)</sup>                         | 0.6             | 195               | 137                                       | 5,945,940                | 100%                             | 5,945,940              | 0.18                   | 1,070,269                     | 424                                | 424   | 106         | 318          | Warehouse         |
| 23                  | Lifestyle Center Commercial <sup>(10)</sup>         | 0.1             | 9                 | 6   | 274,428                  | 100%                             | 274,428                | 0.2                    | 54,886                        | 421                                | 253   | 159         | 94           | Shopping Center   |
| 23                  | Mixed Office  | 0.1             | 4                 | 3   | 121,968                  | 100%                             | 121,968                | 0.4                    | 48,787                        | 133                                | 133   | 24          | 109          | Office            |
| 23                  | Mixed Commercial                                    | 0.1             | 4                 | 3   | 121,968                  | 100%                             | 121,968                | 0.4                    | 48,787                        | 390                                | 234   | 147         | 87           | Shopping Center   |
| 23                  | Office/Tech Flex Space                              | 0.1             | 37                | 26  | 1,128,204                | 100%                             | 1,128,204              | 0.25                   | 282,051                       | 395                                | 395   | 71          | 324          | Office            |
| 23                  | Residential - Multi Family                          | 0.1             | 83                | 58  | 2,530,836                | 100%                             | 2,530,836              | 12                     | 697                           | 374                                | 374   | 243         | 131          | Apartment         |
| 23                  | Office Industrial Campus                            | 0.1             | 73                | 51  | 2,225,916                | 100%                             | 2,225,916              | 0.2                    | 445,183                       | 577                                | 577   | 104         | 473          | Office            |
| 23                  | Civic/Institutional                                 | 0.1             | 37                | 26  | 1,128,204                | 100%                             | 1,128,204              | 0.15                   | 169,231                       | 268                                | 268   | 140         | 129          | Office            |
| 23                  | Mixed Residential                                   | 0.1             | 5                 | 4   | 152,460                  | 100%                             | 152,460                | 30                     | 105                           | 60                                 | 60  | 39          | 21           | Apartment         |
| 23                  | Mixed Retail  | 0.1             | 5                 | 4   | 152,460                  | 100%                             | 152,460                | 0.35                   | 53,361                        | 150                                | 90  | 39          | 50           | Specialty Retail  |
| 24                  | Mixed Residential                                   | 0.1             | 9                 | 6   | 274,428                  | 100%                             | 274,428                | 30                     | 189                           | 104                                | 104   | 68          | 37           | Apartment         |
| 24                  | Mixed Retail  | 0.1             | 10                | 7   | 304,920                  | 100%                             | 304,920                | 0.35                   | 106,722                       | 278                                | 167   | 73          | 93           | Specialty Retail  |
| 24                  | Residential - Multi Family                          | 0.1             | 46                | 32  | 1,402,632                | 100%                             | 1,402,632              | 12                     | 386                           | 209                                | 209   | 136         | 73           | Apartment         |
| 24                  | Residential - Single Family                         | 0.2             | 198               | 139                                       | 6,037,416                | 100%                             | 6,037,416              | 4                      | 554                           | 501                                | 501   | 315         | 185          | Single Family Res |
| 24                  | Neighborhood Commercial                             | 0.1             | 13                | 9   | 396,396                  | 100%                             | 396,396                | 0.18                   | 71,351                        | 193                                | 116   | 51          | 65           | Specialty Retail  |
| 25                  | Residential - Single Family                         | 0.5             | 165               | 116                                       | 5,031,180                | 100%                             | 5,031,180              | 4                      | 462                           | 425                                | 425   | 268         | 157          | Single Family Res |
| 25                  | Residential - Multi Family                          | 0.1             | 33                | 23  | 1,006,236                | 100%                             | 1,006,236              | 12                     | 277                           | 151                                | 151   | 98          | 53           | Apartment         |
| 26                  | Lifestyle Center Commercial                         | 0.1             | 10                | 7   | 304,920                  | 100%                             | 304,920                | 0.18                   | 54,886                        | 421                                | 253   | 159         | 94           | Shopping Center   |
| 26                  | Elementary School                                   | 0.1             | 34                | 24  | 1,036,728                | 100%                             | 1,036,728              | 0.1                    | 103,673                       | 276                                | 276   | 119         | 157          | Elementary School |
| 26                  | Residential - Multi Family                          | 0.4             | 107               | 75  | 3,262,644                | 100%                             | 3,262,644              | 12                     | 899                           | 481                                | 481   | 312         | 168          | Apartment         |
| 26                  | Residential - Single Family                         | 0.5             | 213               | 149                                       | 6,494,796                | 100%                             | 6,494,796              | 4                      | 596                           | 535                                | 535   | 337         | 198          | Single Family Res |
| 26                  | Office Industrial Campus                            | 0.1             | 42                | 29  | 1,280,664                | 100%                             | 1,280,664              | 0.2                    | 256,133                       | 366                                | 366   | 66          | 300          | Office            |
| 26                  | Neighborhood Commercial                             | 0.1             | 8                 | 6   | 243,936                  | 100%                             | 243,936                | 0.18                   | 43,908                        | 127                                | 76  | 33          | 43           | Specialty Retail  |
| 27                  | Office Industrial Campus                            | 0.1             | 48                | 34  | 1,463,616                | 100%                             | 1,463,616              | 0.2                    | 292,723                       | 407                                | 407   | 73          | 333          | Office            |
| 27                  | Industrial/Commercial                               | 0.1             | 54                | 38  | 1,646,568                | 100%                             | 1,646,568              | 0.18                   | 296,382                       | 260                                | 260   | 31          | 229          | Industrial        |
| 22                  | Highway Commercial                                  | 0.1             | 25                | 18  | 762,300                  | 100%                             | 762,300                | 0.15                   | 114,345                       | 684                                | 410   | 259         | 152          | Shopping Center   |
| 28                  | Residential - Single Family                         | 0.2             | 24                | 17  | 731,808                  | 100%                             | 731,808                | 4                      | 67                            | 75                                 | 75  | 47          | 28           | Single Family Res |
|                     |   |                 | 1,556             | 1,089                                     |                          |                                  |                        |                        |                               |                                    |   |             |              |                   |
|                     |   |                 |                   | 467                                       |                          |                                  |                        |                        |                               |                                    |   |             |              |                   |

Notes:

- <sup>(1)</sup> FAR and trip generation rates were given by the City of Mankato
- <sup>(3)</sup> All commercial developments are assumed to be shopping centers under 600,000 square feet.
- <sup>(4)</sup> All industrial developments are assumed to be light industrial developments.
- <sup>(5)</sup> Parks and public land are assumed to not generate trips in the PM peak hour.
- <sup>(6)</sup> Based on the amount of projected future growth (provided by the City of Mankato 6/3/05).
- <sup>(7)</sup> Includes a 40% reduction for all commercial trips.
- <sup>(8)</sup> Breakdown of Mixed Office/Commercial is 50% Office and 50% Commercial
- <sup>(9)</sup> Breakdown of the Mixed Residential/Retail is 50% Office and 50% Commercial
- <sup>(10)</sup> Original estimated acreage reduced to account for large wetlands.
- <sup>(11)</sup> Original estimated acreage reduced by 30 percent to account for road right-of-way, stormwater ponds, and gas line right-of-way.

|             |              |       | Percent of Total Trips |
|-------------|--------------|-------|------------------------|
| Commercial  | 784,559 SF   | 2,437 | 0.28                   |
| Industrial  | 1,366,651 SF | 685   | 0.08                   |
| Office      | 1,719,749 SF | 2,638 | 0.30                   |
| Residential |              |       |                        |
| Single Fam  | 1,680 units  | 1,535 | 0.18                   |
| Multi-Fam   | 2,449 units  | 1,379 | 0.16                   |
| 8,673       |              |       | Total Number of Trips  |



Scenario A of '05 AUAR  
Summary row

TABLE B.2  
2025 SCENARIO A FUTURE LAND USE ANALYSIS (ESTIMATED AREA AND TRIPS)<sup>(1)</sup>

| 2005<br>Traffix | 2005 Map Zone<br>Number | Development Type <sup>(2), (3),<br/>(4), (5)</sup> | mi <sup>2</sup> | Estimated<br>Acreage | Estimated<br>Square<br>Footage | Existing<br>Square<br>Footage | Percent Developed<br>in AUAR Build Out<br>Year <sup>(6)</sup> | Reduced<br>Square<br>Footage | Floor Area<br>Ratio<br>(FAR) | Floor Area<br>(sf)<br>or<br># of Units | Total<br>GeneratedPM<br>Peak Hour Trips | Reduced<br>Generated<br>PM Peak<br>Hour Trips <sup>(7)</sup> | PM In (vph)         | PM Out (vph)        |
|-----------------|-------------------------|--|-----------------|----------------------|--------------------------------|-------------------------------|---|------------------------------|------------------------------|--|---|--|---------------------|---------------------|
| 23              | 5                       | Commercial   | 0.3             | 160                  | 6,969,600                      |                               | 90%   | 6,272,640                    | 0.18 / 0.1 / ..              |  |   |  |                     |                     |
|                 | 5a - Commercial         |  |                 | 64                   | 2,787,840                      | 1,486,703                     | 100%  | 1,301,137                    | 0.18                         | 234,205                                | 1,098                                   | 768  | 369                 | 400                 |
|                 | 5b - Mn/DOT Office      |  |                 | 40                   | 1,742,400                      |                               | 100%  | 1,742,400                    | 0.10                         | 174,240                                | 274                                     | 274  | 47                  | 227                 |
|                 | 5c - Clinic             |  |                 | 20                   | 871,200                        |                               | 100%  | 871,200                      | 0.18                         | 156,816                                | 479                                     | 479  | 129                 | 350                 |
|                 | 5d - Nat'l Guard Armory |  |                 | 20                   | 871,200                        |                               | 100%  | 871,200                      | 0                            | 0                                      | 0                                       | 0  | 0                   | 5                   |
| 11              | 8                       | Commercial   | 0.2             | 96                   | 4,181,760                      | 1,209,666                     | 100%  | 2,972,094                    | 0.18                         | 534,977                                | 1,894                                   | 1,326  | 478                 | 518                 |
| 10              | 9                       | Industrial   |                 | 134                  | 5,837,040                      |                               | 5%  | 291,852                      | 0.15                         | 43,778                                 | -101                                    | -101   | 5                   | 33                  |
| 9               | 10A <sup>(8)</sup>      | Dist'n Cntr - Trucks                               |                 | 157                  | 6,838,920                      |                               | 100%  |                              |                              | 1,052,000                              | 88                                      | 88   | 44                  | 44                  |
| 20              | 10B <sup>(8)</sup>      | Dist'n Cntr - Employees                            |                 | 157                  | 6,838,920                      |                               | 100%  |                              |                              |  | 201                                     | 201  | 70                  | 131                 |
| 8               | 10C                     | Industrial   |                 | 80                   | 3,484,800                      |                               | 100%  | 3,484,800                    | 0.15                         | 522,720                                | 584                                     | 584  | 70                  | 514                 |
| 21              | 11                      | Industrial   |                 | 28                   | 1,219,680                      |                               | 5%  | 60,984                       | 0.15                         | 9,148                                  | -150                                    | -150   | 1                   | 8                   |
| 5               | 12                      | Industrial   | 0.4             | 165                  | 7,187,400                      |                               | 50%   | 3,593,700                    | 0.15                         | 539,055                                | 607                                     | 607  | 73                  | 535                 |
| 4               | 13                      | Commercial   | 0.1             | 80                   | 3,484,800                      | 855,083                       | 50%   | 887,317                      | 0.18                         | 159,717                                | 853                                     | 597  | 286                 | 310                 |
|                 | 14                      |  |                 |                      |                                |                               |   |                              |                              |  |   |  |                     |                     |
| 3               | 15                      | Residential / Industrial                           | 0.4             | 240                  | 10,454,400                     |                               | 13%   | 1,359,072                    | 4/.15                        | 26,173                                 |   |  |                     |                     |
|                 |                         | Residential  |                 | 80                   | 3,484,800                      | 653,400                       | 25%   | 217,800                      | 4                            | 5                                      | 7                                       | 7  | 4                   | 3                   |
|                 |                         | Residential  |                 | 80                   | 3,484,800                      |                               | 10%   |                              | 4                            | 32                                     | 38                                      | 38   | 24                  | 14                  |
|                 |                         | Industrial   |                 | 80                   | 3,484,800                      |                               | 5%  | 174,240                      | 0.15                         | 26,136                                 | -126                                    | -126   | 3                   | 23                  |
| 2               | 16                      | Residential  | 0.1             | 80                   | 3,484,800                      | 435,600                       | 50%   | 70                           | 4                            | 140                                    | 145                                     | 145  | 91                  | 54                  |
| 18              | 19 <sup>(10)</sup>      | Residential  |                 | 219                  | 9,546,900                      | 1,084,644                     | 25%   |                              | 4                            | 194                                    | 195                                     | 195  | 61 (Total<br>123)   | 36 (Total<br>72)    |
|                 |                         | Residential  |                 | 4                    | 163,350                        |                               | 100%  |                              | 4                            | 15                                     | 15                                      |  |                     |                     |
|                 |                         | Residential  |                 | 31                   | 1,361,250                      |                               | 100%  |                              | 4                            | 125                                    | 126                                     |  |                     |                     |
|                 |                         | Residential  |                 | 8                    | 338,800                        |                               | 100%  |                              | 4                            | 31                                     | 31                                      |  |                     |                     |
|                 |                         | Residential  |                 | 83                   | 3,636,050                      |                               | 100%  |                              | 4                            | 334                                    | 337                                     |  |                     |                     |
|                 |                         | Residential  |                 | 38                   | 1,675,850                      |                               | 100%  |                              | 4                            | 154                                    | 155                                     |  |                     |                     |
|                 |                         | Residential  |                 | 22                   | 943,800                        |                               | 100%  |                              | 4                            | 87                                     | 88                                      |  |                     |                     |
|                 |                         | Residential  |                 | 13                   | 580,800                        |                               | 100%  |                              | 4                            | 53                                     | 54                                      |  |                     |                     |
|                 |                         | Residential  |                 | 19                   | 847,000                        |                               | 100%  |                              | 4                            | 78                                     | 79                                      |  |                     |                     |
|                 |                         | Park   |                 | 18                   | 774,400                        |                               | 0%  | 0                            |                              |  |   |  |                     |                     |
|                 |                         | Park   |                 | 7                    | 290,400                        |                               | 0%  | 0                            |                              |  |   |  |                     |                     |
| 7               | 20 <sup>(9)</sup>       | Commercial / Public                                |                 | 329                  | 14,338,500                     | 2,542,726                     | 50%   | 10,901,130                   | 0.18                         | 1,289,812                              | 3,385                                   | 2,369  | 568<br>(Total 1137) | 616<br>(Total 1232) |
|                 |                         | Commercial / Public                                |                 | 122                  | 5,333,075                      |                               | 100%  | 5,333,075                    | 0.18                         | 959,954                                | 2,772                                   |  |                     |                     |
|                 |                         | TH 14  |                 | 3                    | 139,150                        |                               | 0%  |                              |                              |  |   |  |                     |                     |
|                 |                         | Public   |                 | 11                   | 465,850                        |                               | 0%  |                              |                              |  |   |  |                     |                     |
|                 |                         | Public   |                 | 15                   | 665,500                        |                               | 0%  |                              |                              |  |   |  |                     |                     |
|                 |                         | Public   |                 | 2                    | 90,750                         |                               | 0%  |                              |                              |  |   |  |                     |                     |
|                 |                         | Commercial   |                 | 125                  | 5,426,850                      |                               | 100%  | 5,426,850                    | 0.18                         | 976,833                                | 2,803                                   |  |                     |                     |
|                 |                         | Commercial   |                 | 82                   | 3,578,575                      |                               | 75%   | 2,683,931                    | 0.18                         | 644,144                                | 2,150                                   |  |                     |                     |
| 6               | 21 <sup>(9)</sup>       | Residential / Park                                 |                 | 209                  | 9,084,075                      | 4,051,080                     | 100%  |                              | 4                            | 462                                    | 425                                     | 425  | 134<br>(Total 268)  | 79 (Total<br>157)   |
|                 |                         | Residential  |                 | 32                   | 1,391,500                      |                               | 100%  |                              | 4                            | 128                                    | 129                                     |  |                     |                     |
|                 |                         | Residential  |                 | 18                   | 765,325                        |                               | 100%  |                              | 4                            | 70                                     | 71                                      |  |                     |                     |
|                 |                         | Residential  |                 | 128                  | 5,566,000                      |                               | 100%  |                              | 4                            | 511                                    | 516                                     |  |                     |                     |
|                 |                         | Residential  |                 | 10                   | 435,600                        |                               | 100%  |                              | 4                            | 40                                     | 40                                      |  |                     |                     |
|                 |                         | Residential  |                 | 21                   | 925,650                        |                               | 100%  |                              | 4                            | 85                                     | 86                                      |  |                     |                     |
|                 |                         | Park   |                 | 68                   | 2,964,500                      |                               | 0%  |                              |                              |  |   |  |                     |                     |
| 1               | 22 <sup>(9)</sup>       | Residential  |                 | 83                   | 3,617,900                      | 651,418                       | 75%   |                              | 4                            | 204                                    | 204                                     | 204  | 65<br>(total 130)   | 38<br>(total 76)    |
|                 |                         |  |                 |                      |                                |                               |   |                              |                              |  |   |  |                     |                     |

<sup>(1)</sup> FAR and trip generation rates are based on assumptions from the River Hills Mall Study (MATAPS)

<sup>(2)</sup> All residential developments are assumed to be low-density developments.

<sup>(3)</sup> All commercial developments are assumed to be shopping centers with under 600,000 square feet.

<sup>(4)</sup> All industrial developments are assumed to be light industrial developments.

<sup>(5)</sup> Parks and public land are assumed to not generate trips in the PM peak hour.

<sup>(6)</sup> Based on the amount of projected future growth (provided by the City of Mankato 6/3/05).

<sup>(7)</sup> Includes a 30% reduction for all commercial trips.

<sup>(8)</sup> Number of trips provided by developer. Distribution based on average ITE trip info for similar land uses

<sup>(9)</sup> PM peak hour trips (in and out) were reduced by 50 percent, assuming that 50 percent of trips use of the TH 14/CSAH 3 interchange and the Victory Drive extension.

<sup>(10)</sup> Assumes only 25% of trips from this zone enter the study area

Commercial  
Industrial  
Residential  
Office

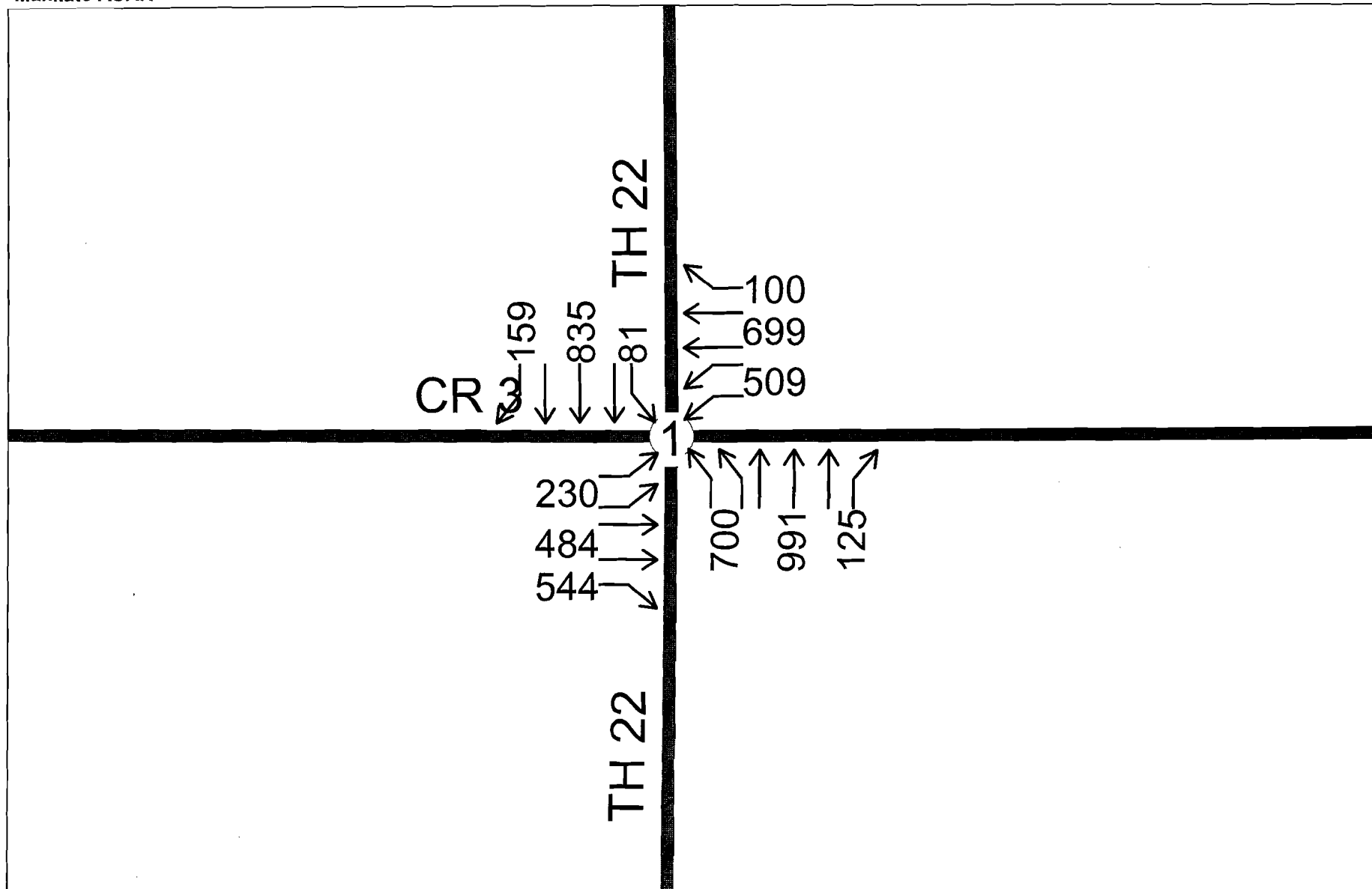
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2,192,836 SF  
1,038 units  
331,056 SF

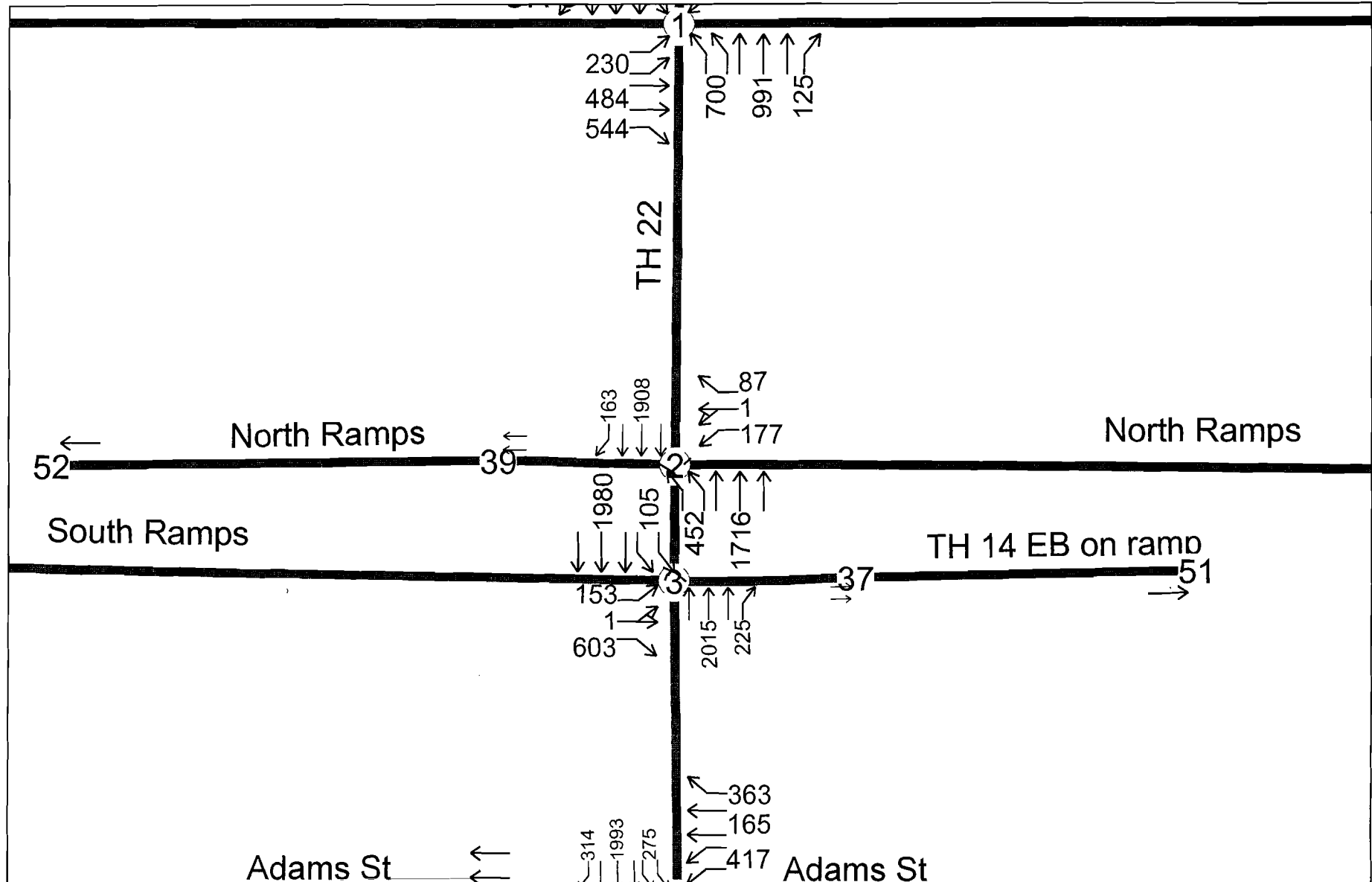
3,498  
1,557  
1,017  
753

6,825    Total Number

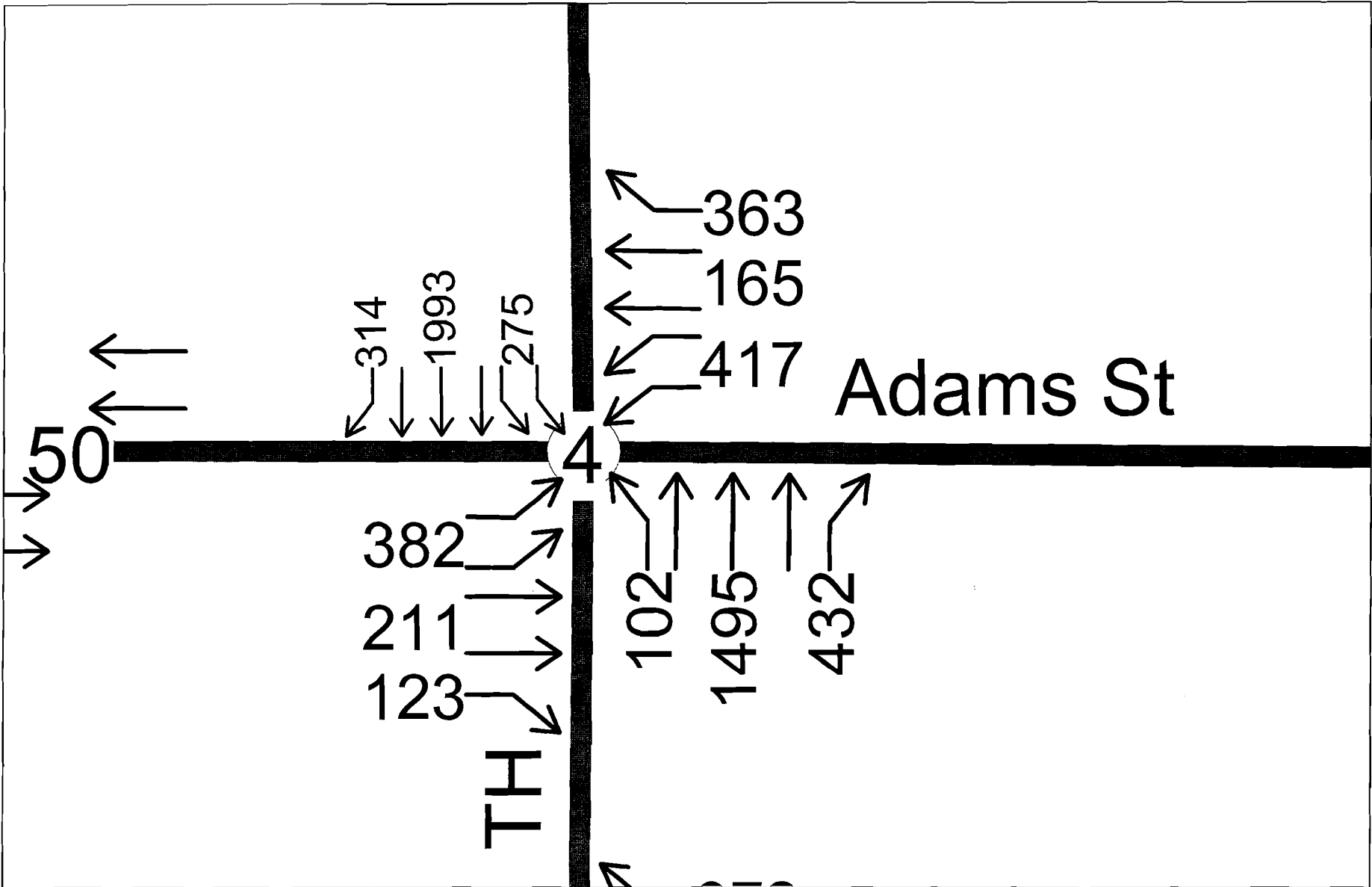
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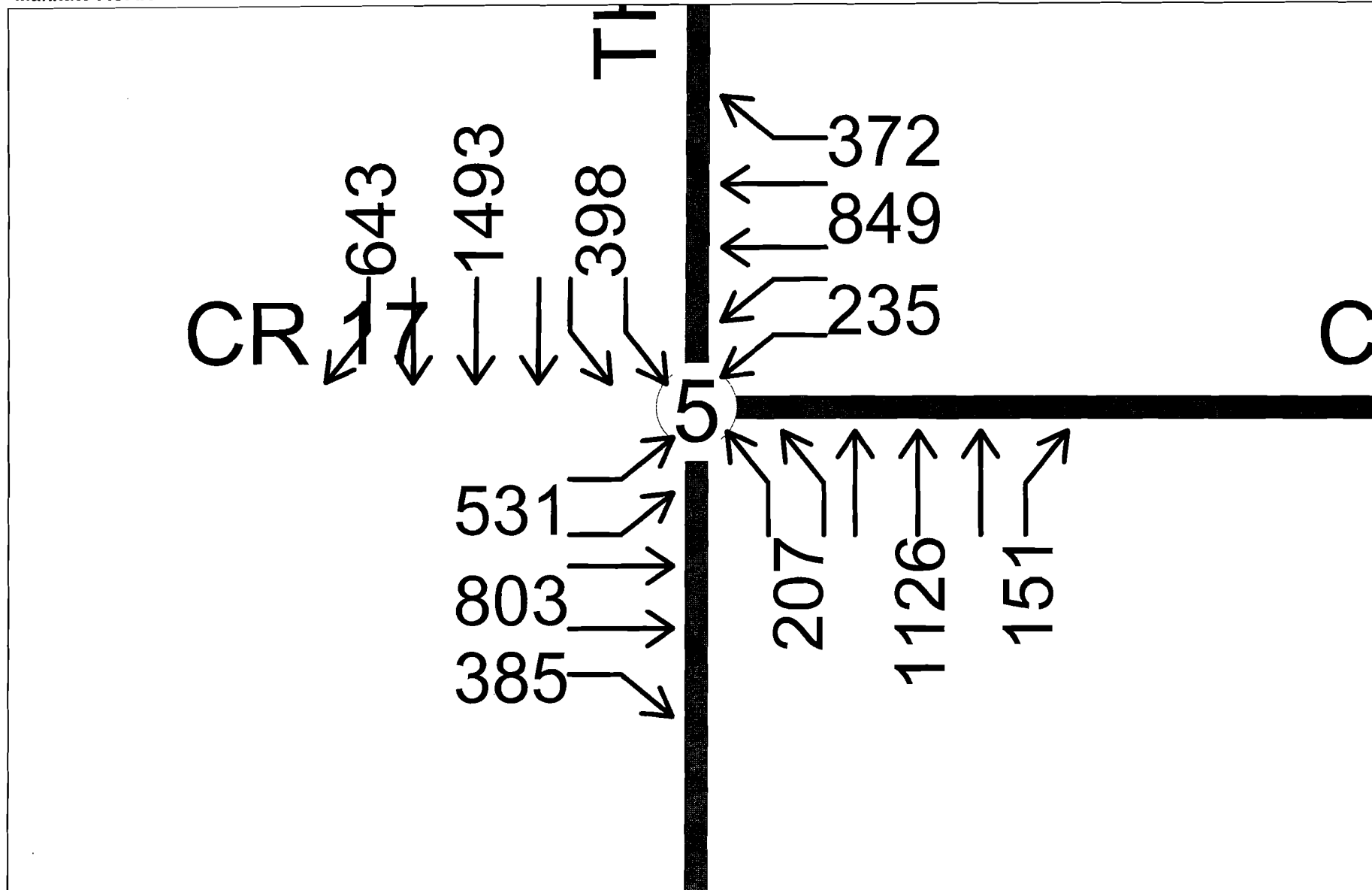


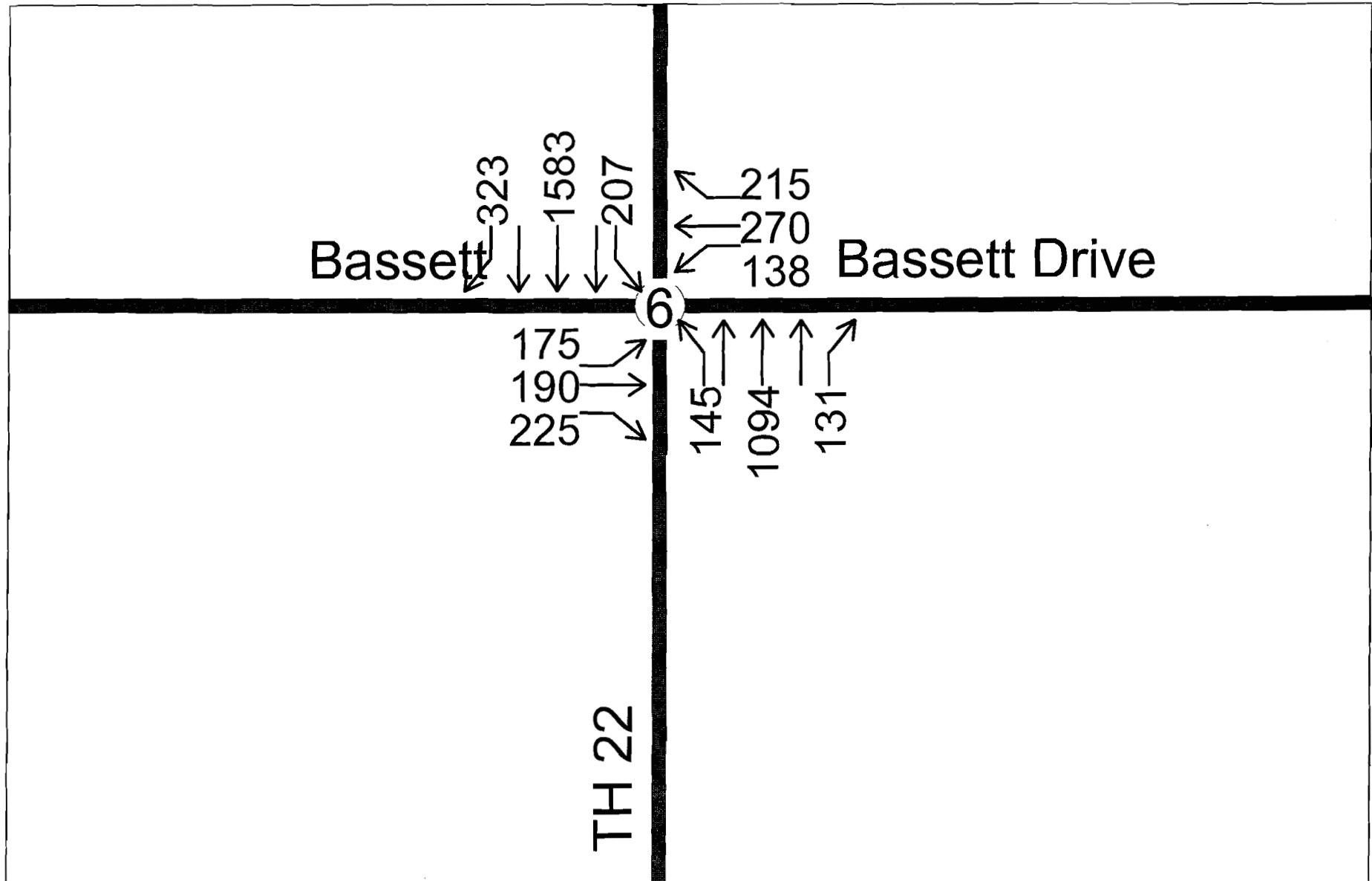


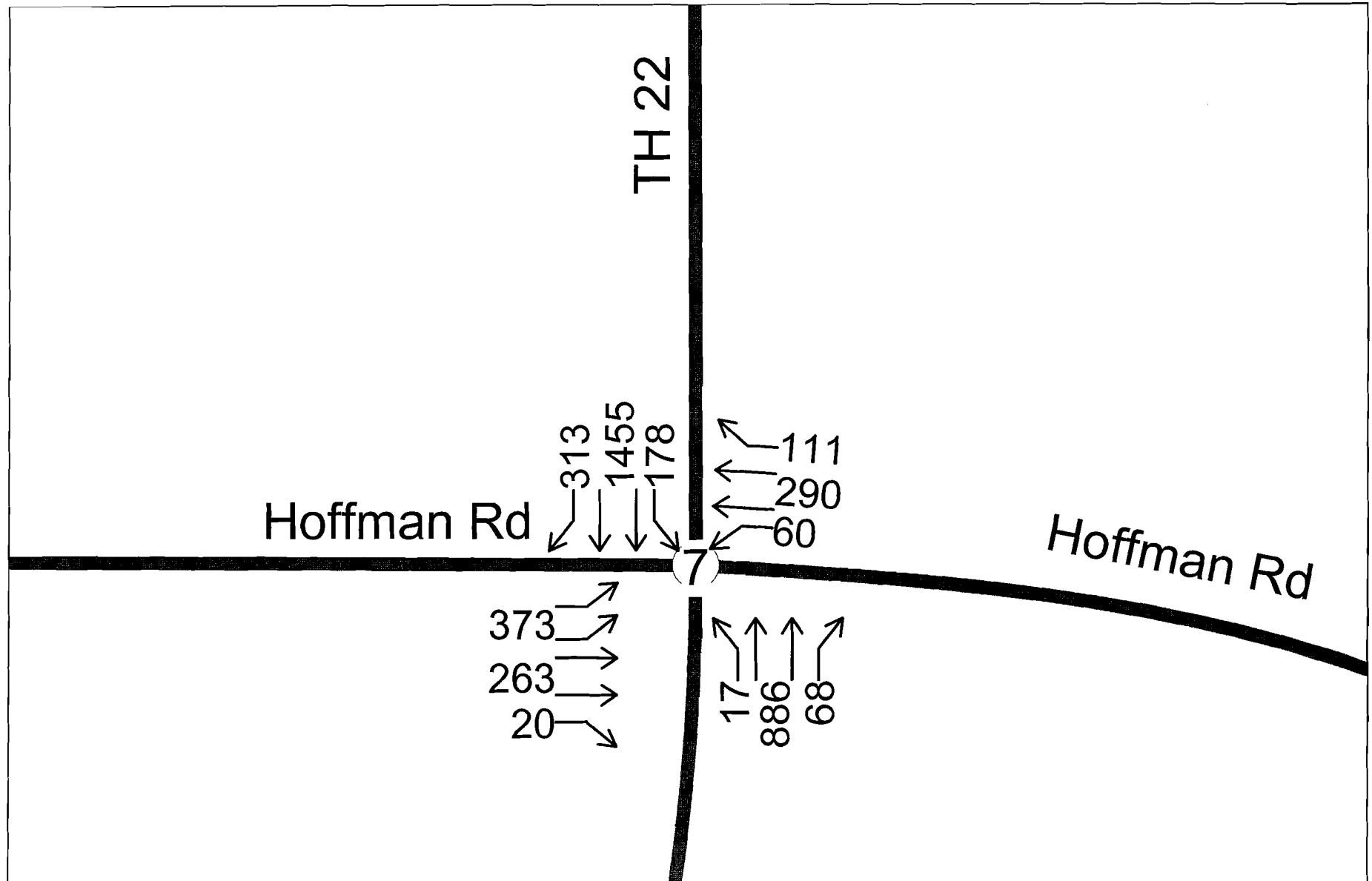




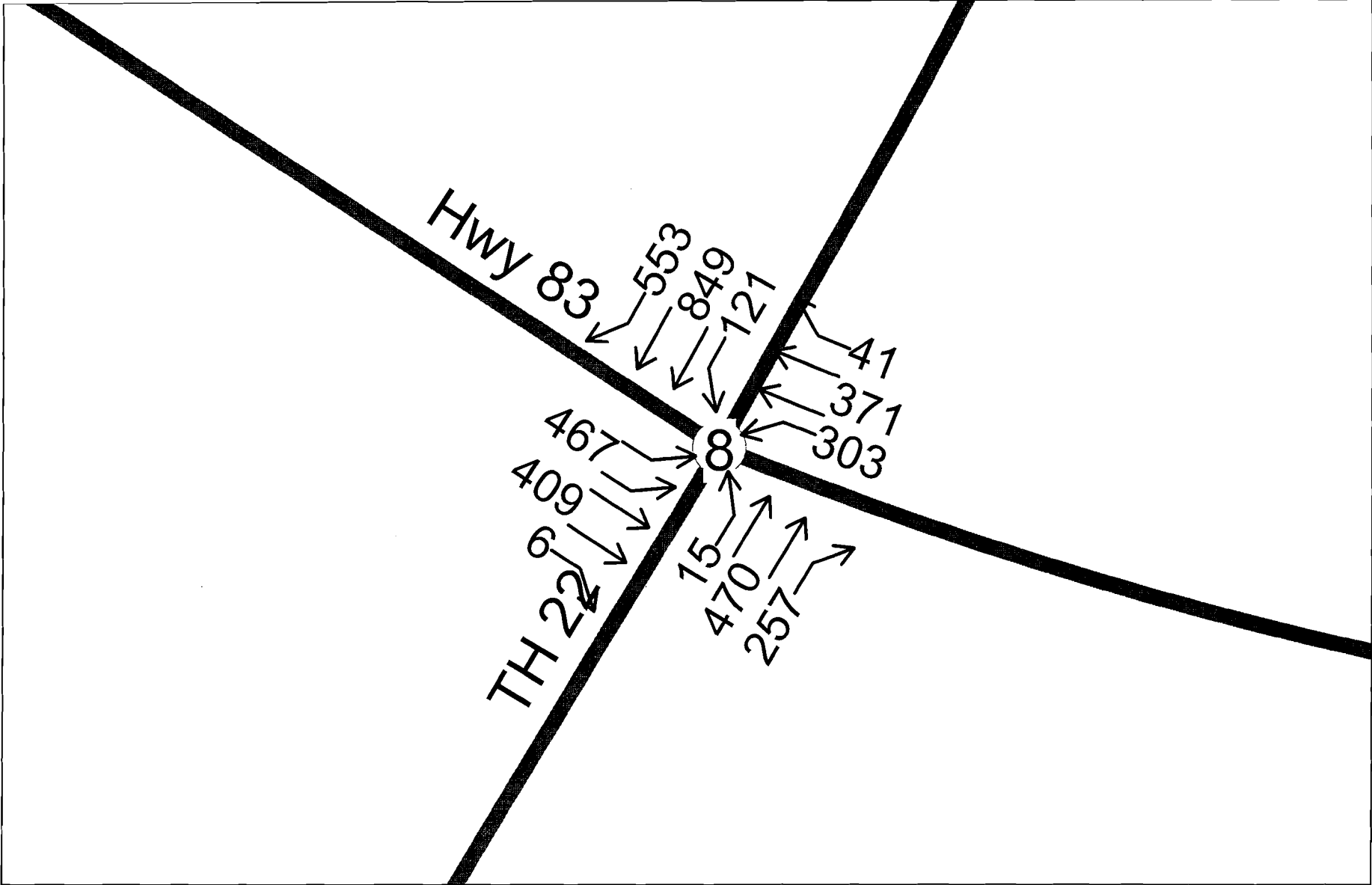


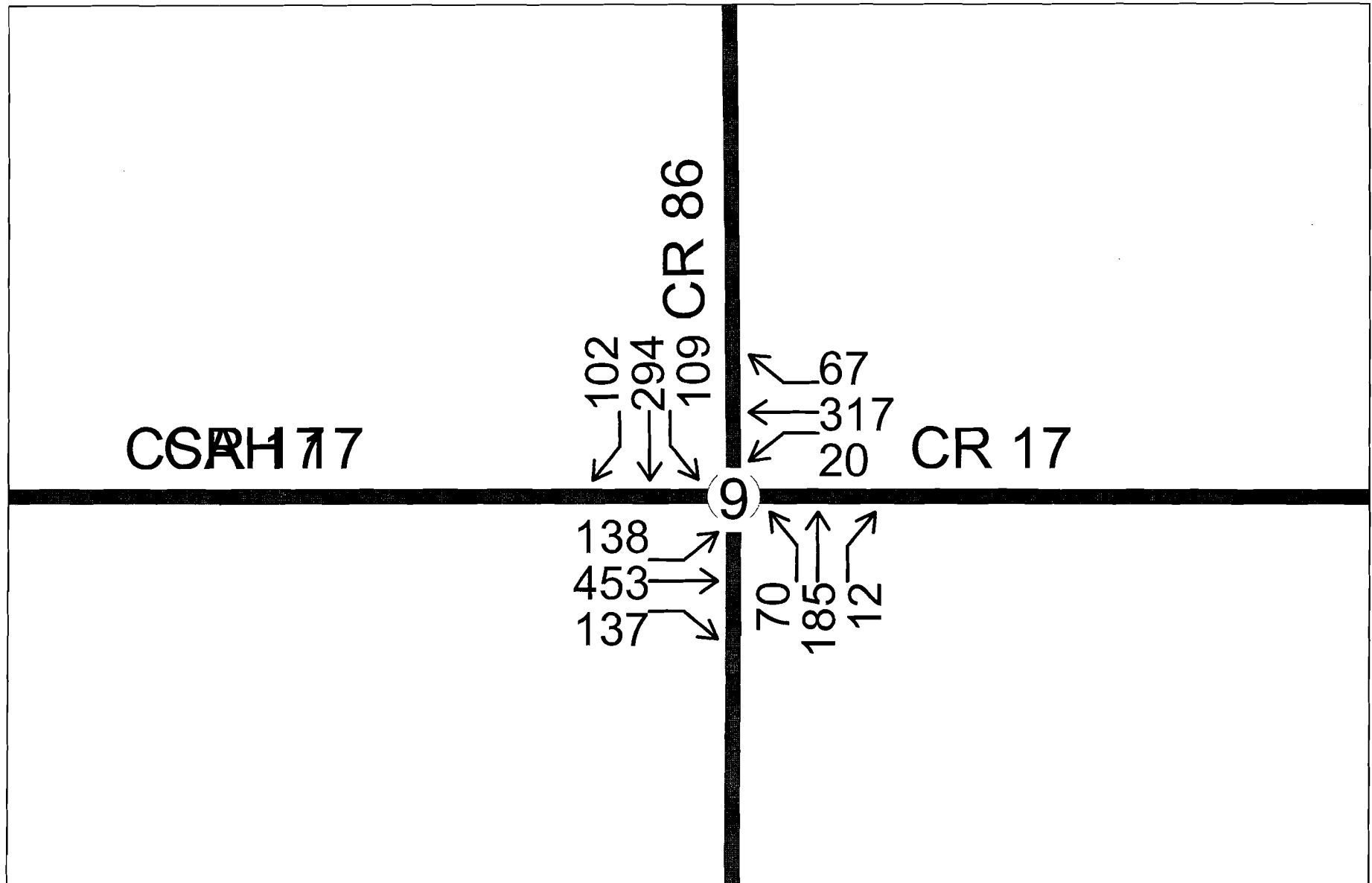


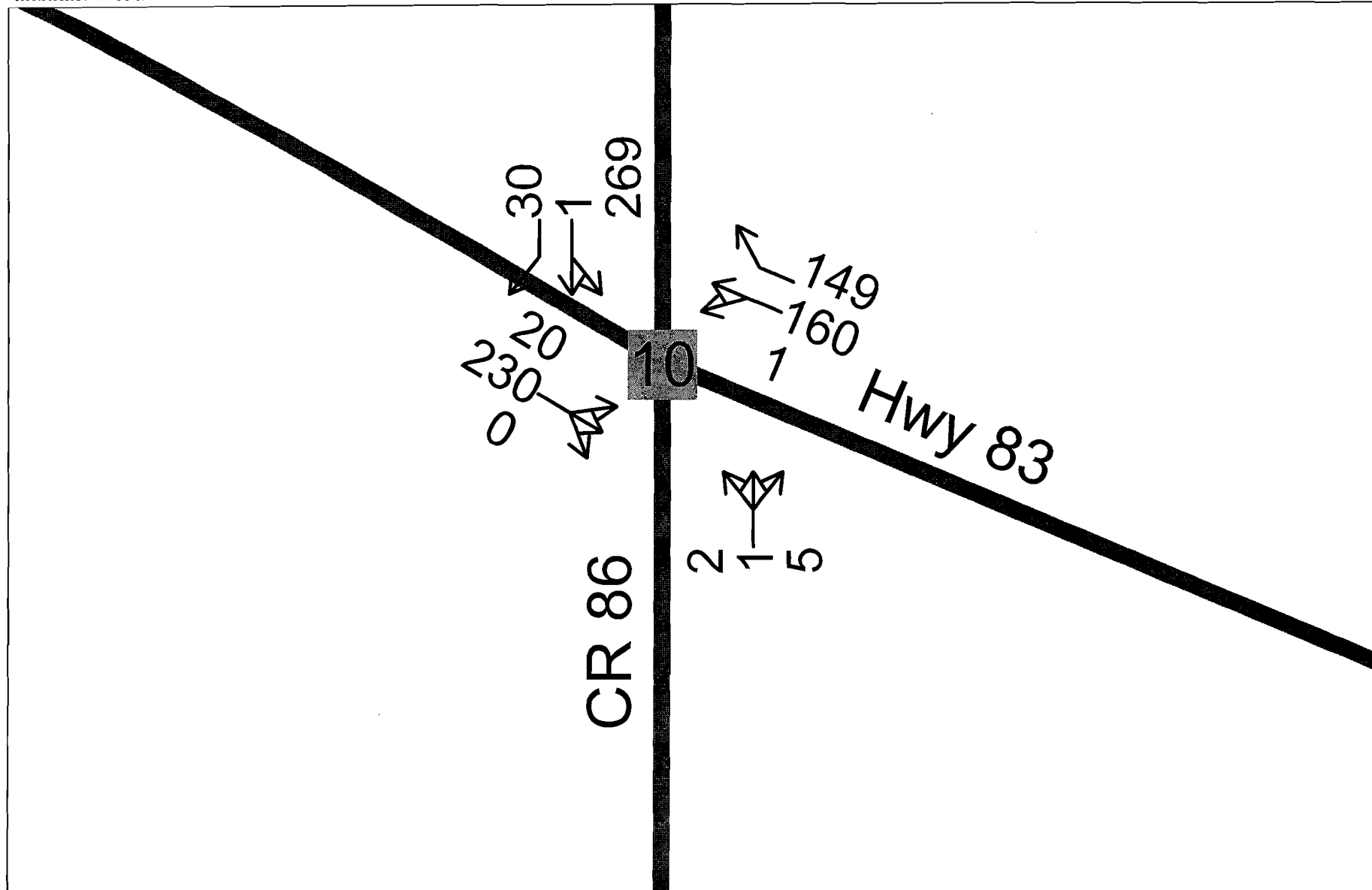


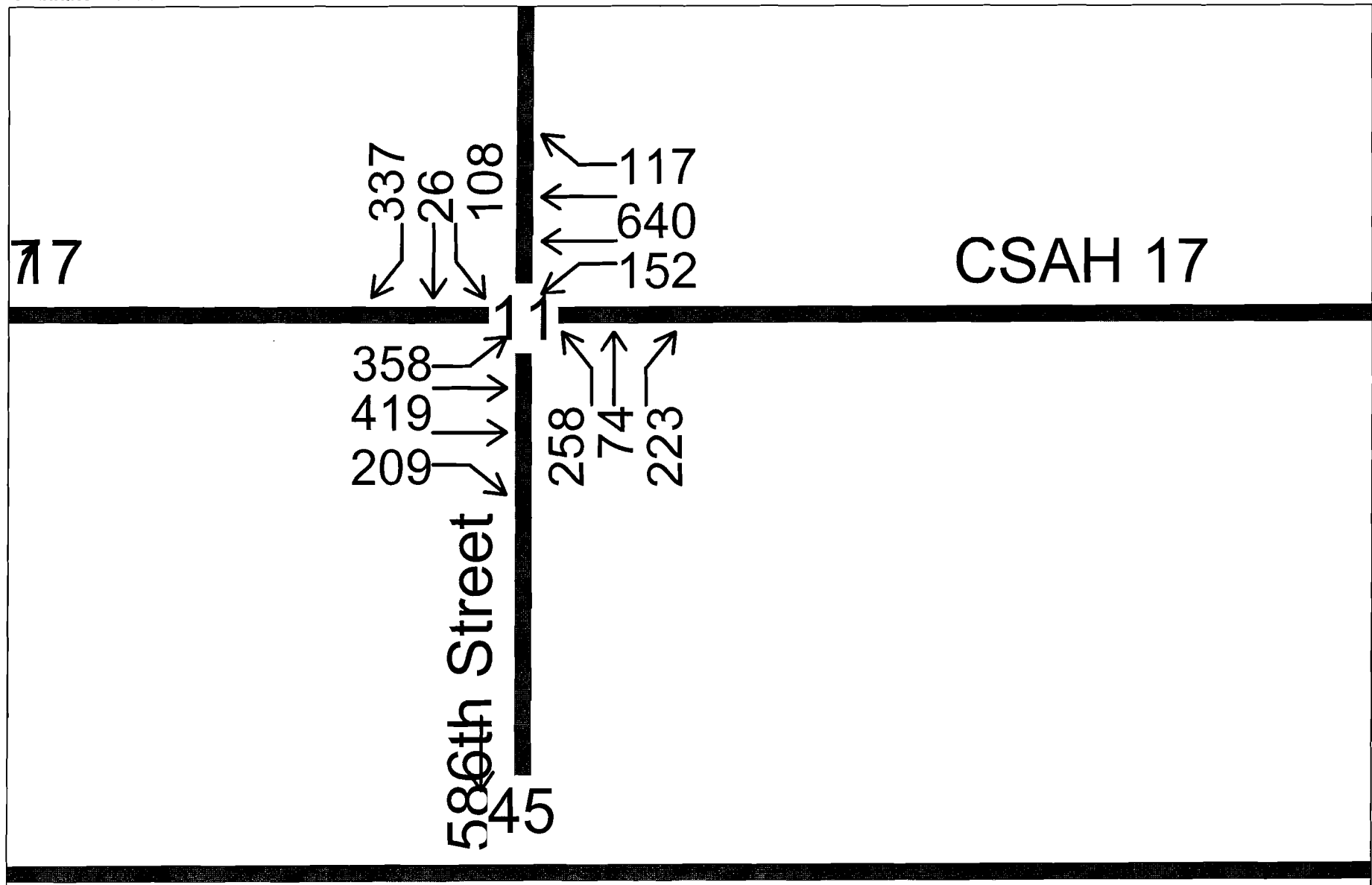




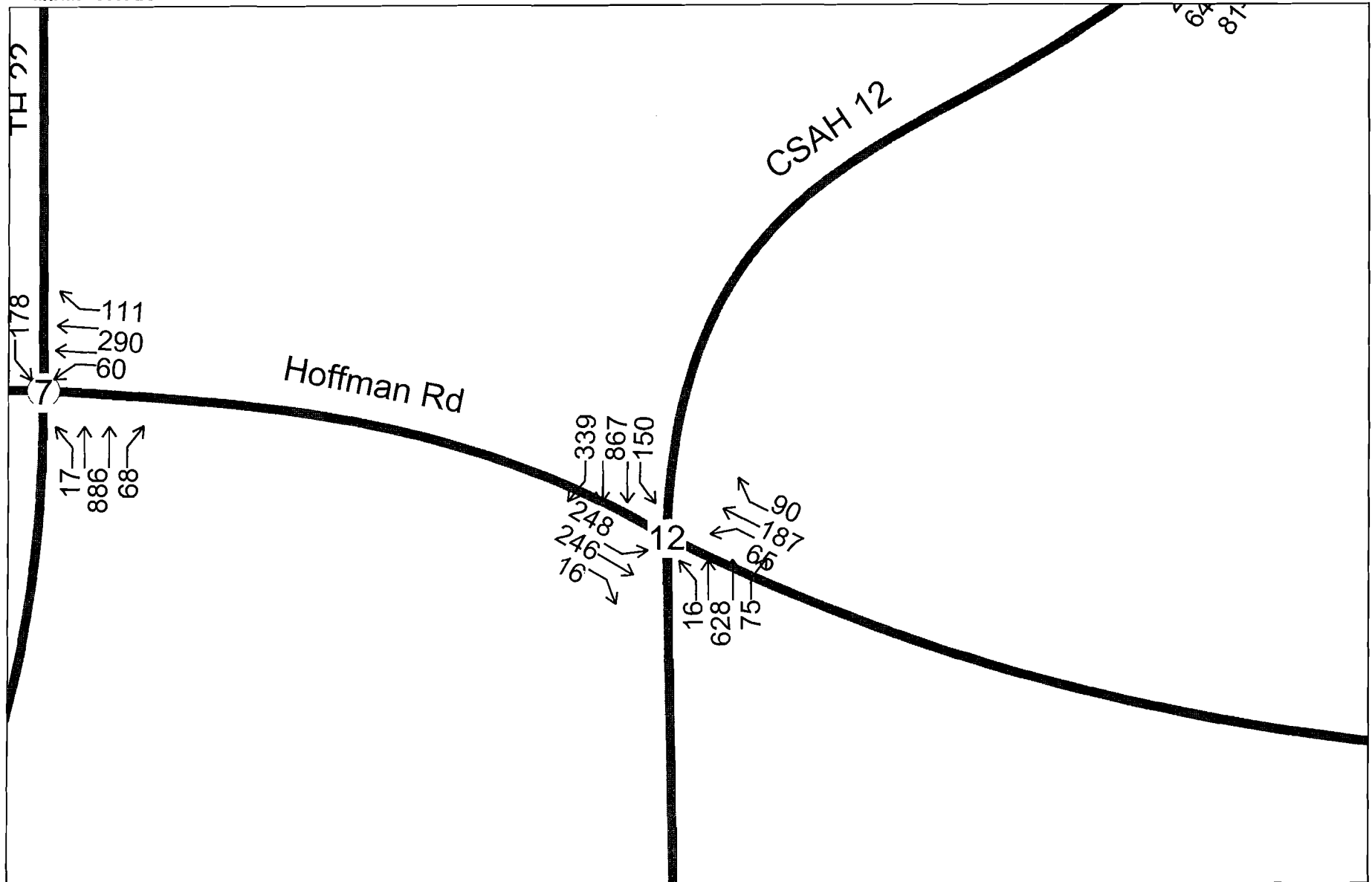






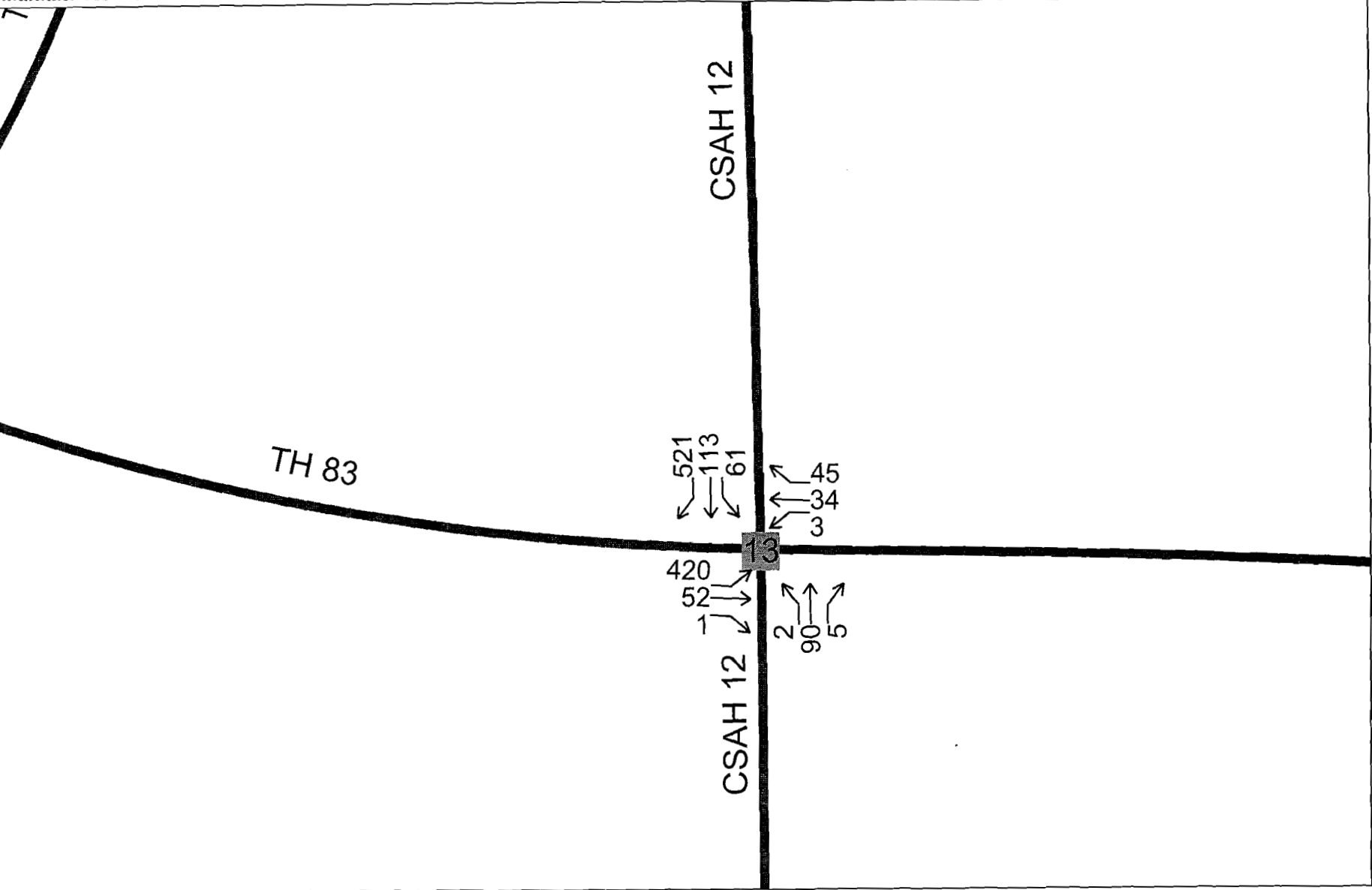


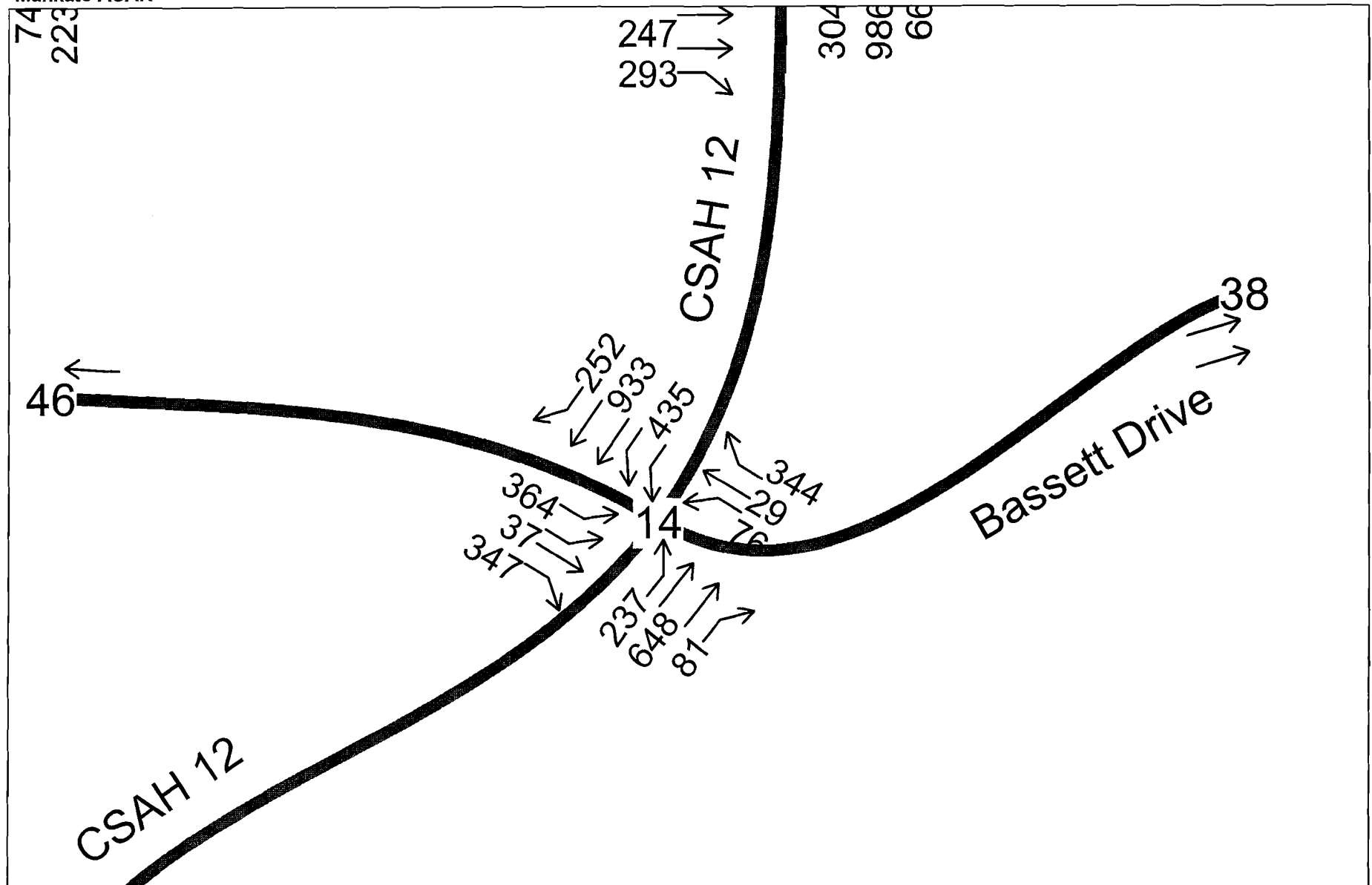


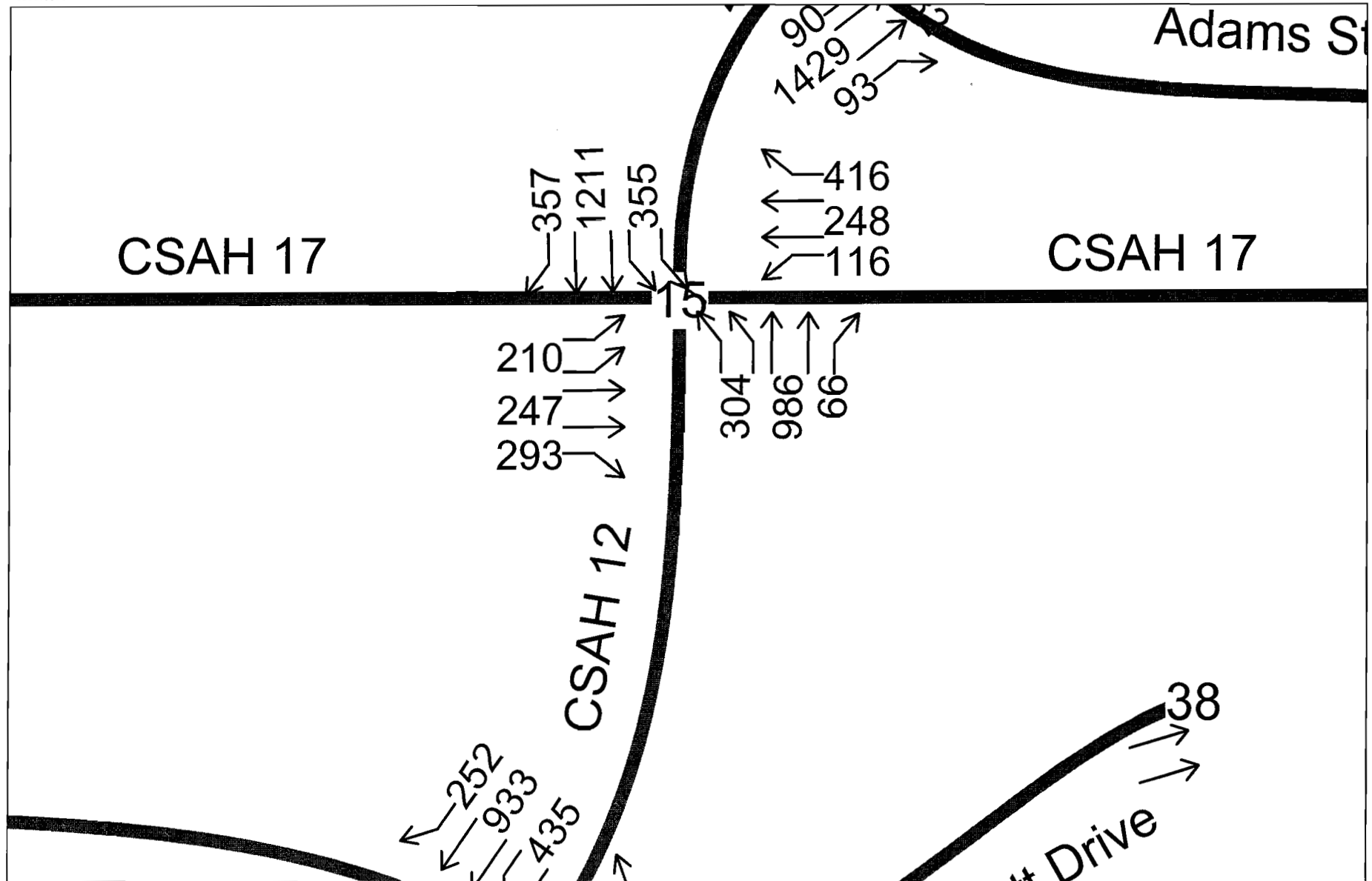


Full Build PM

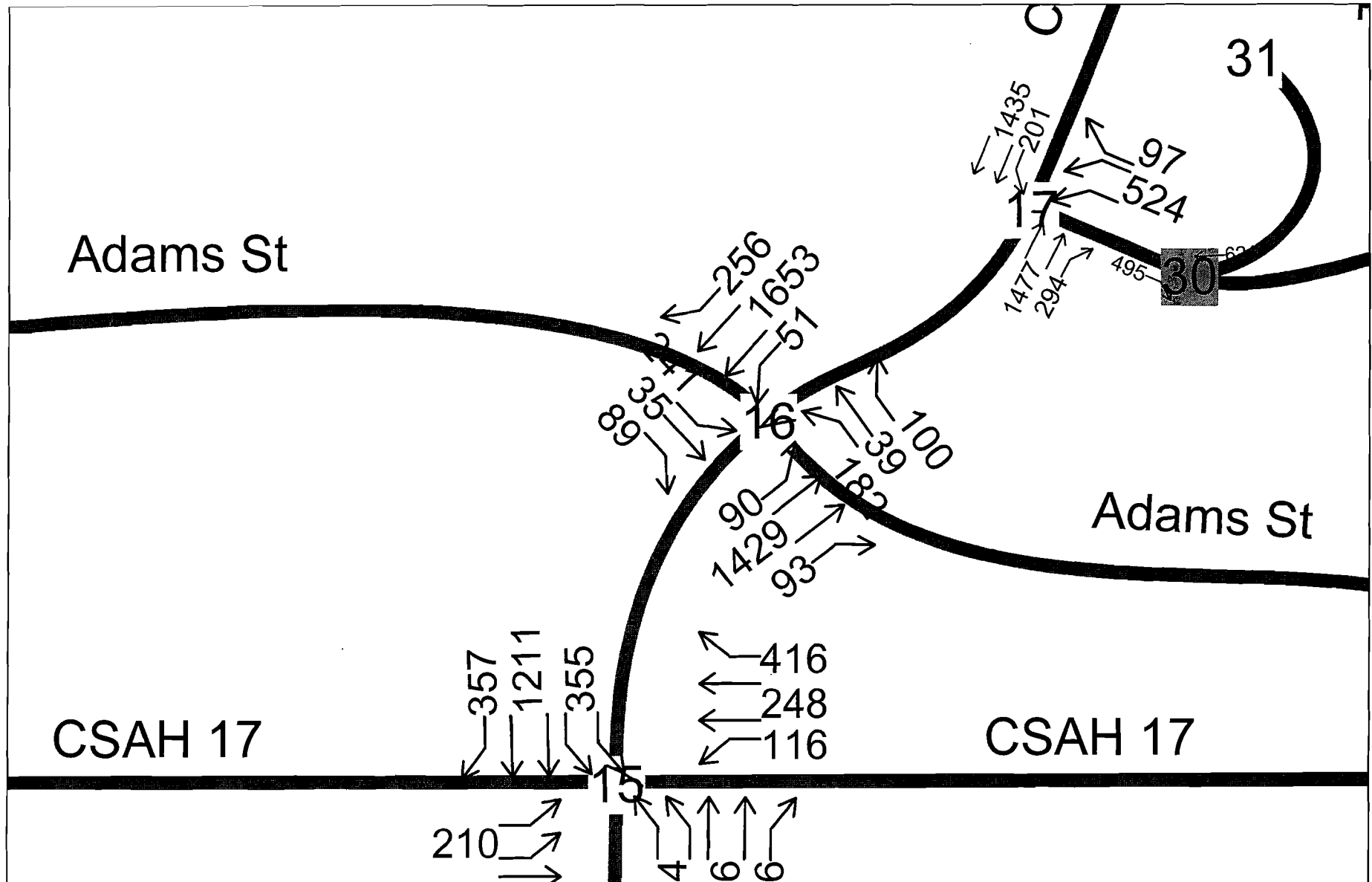
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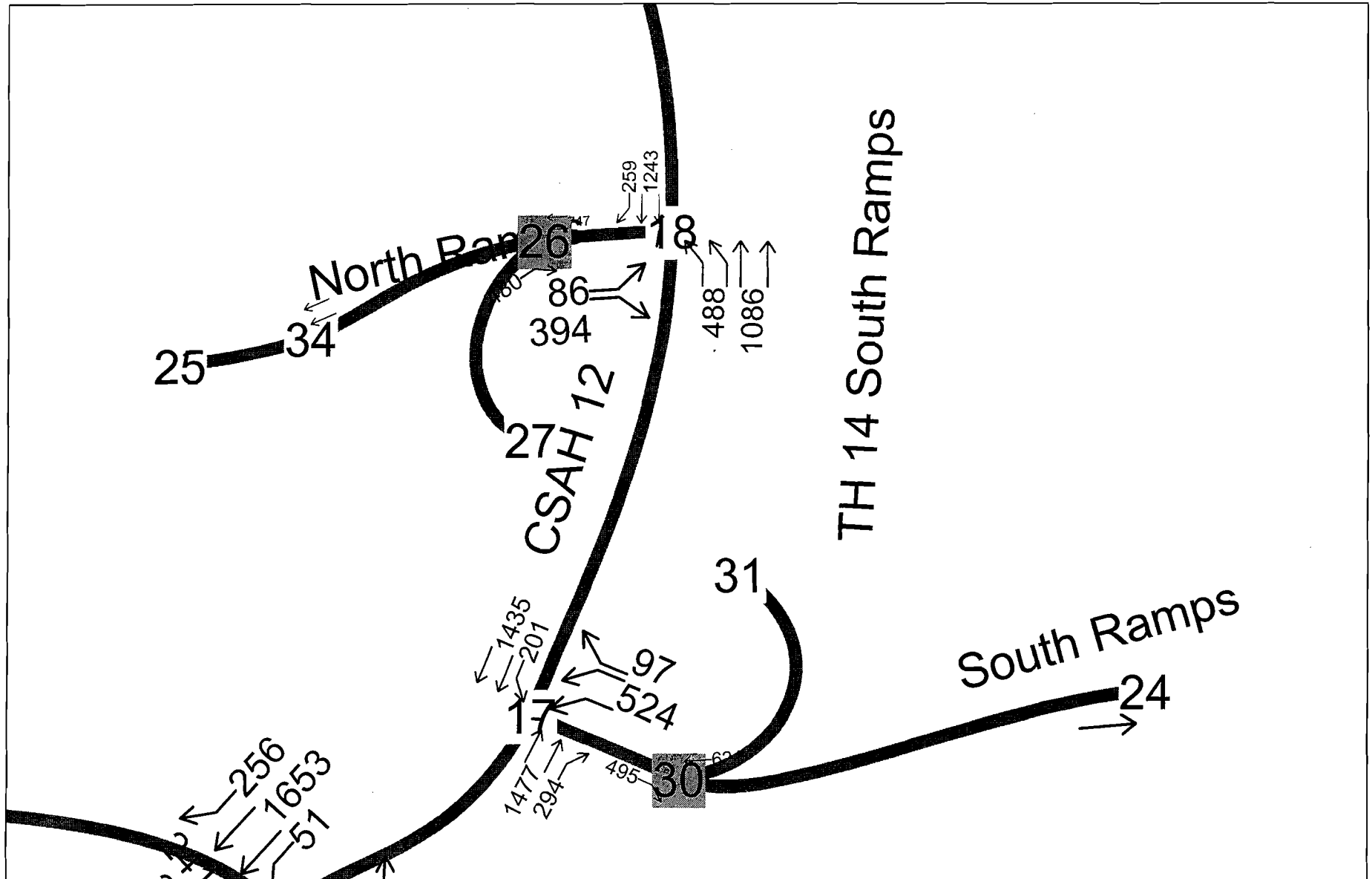






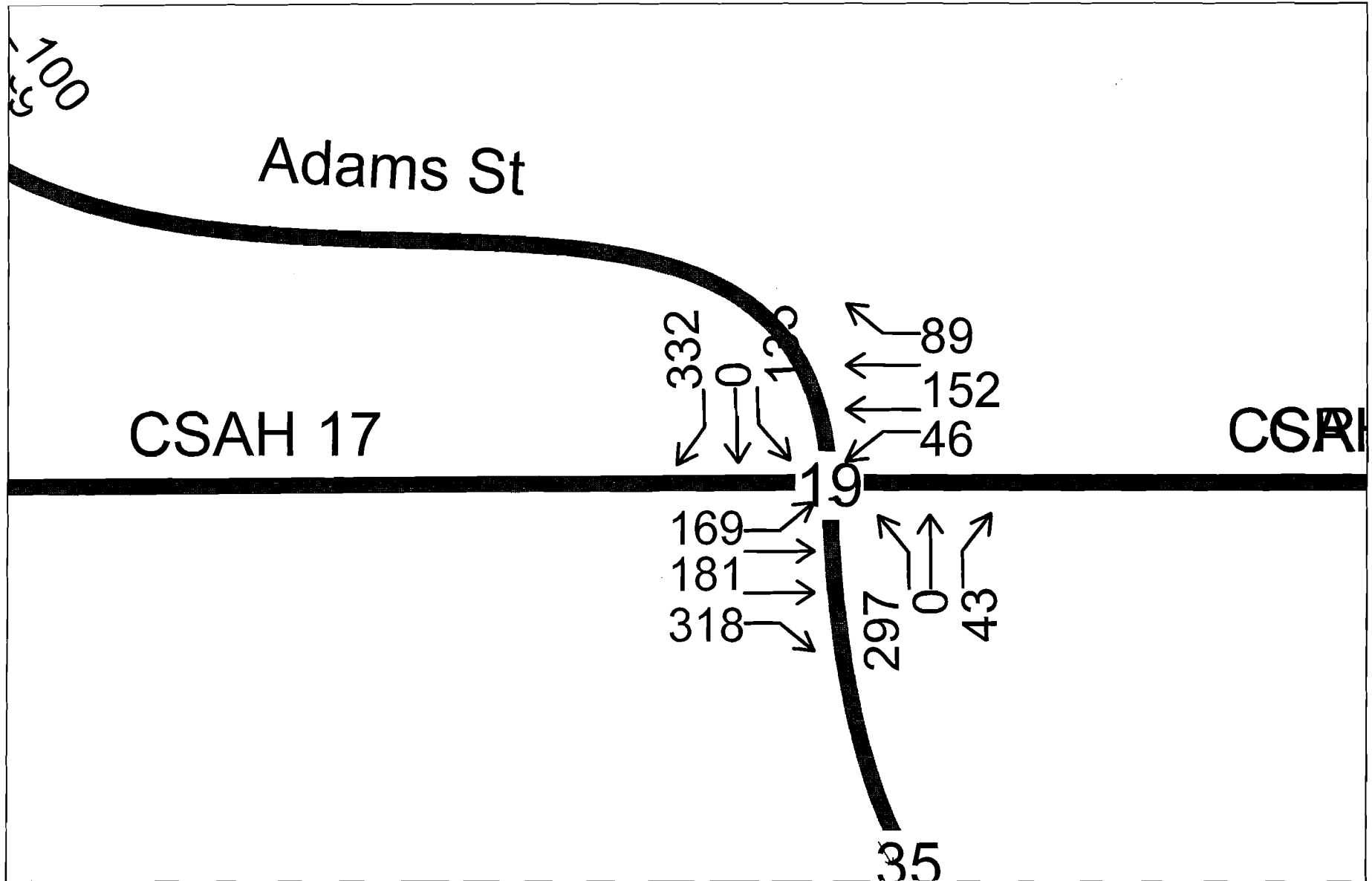


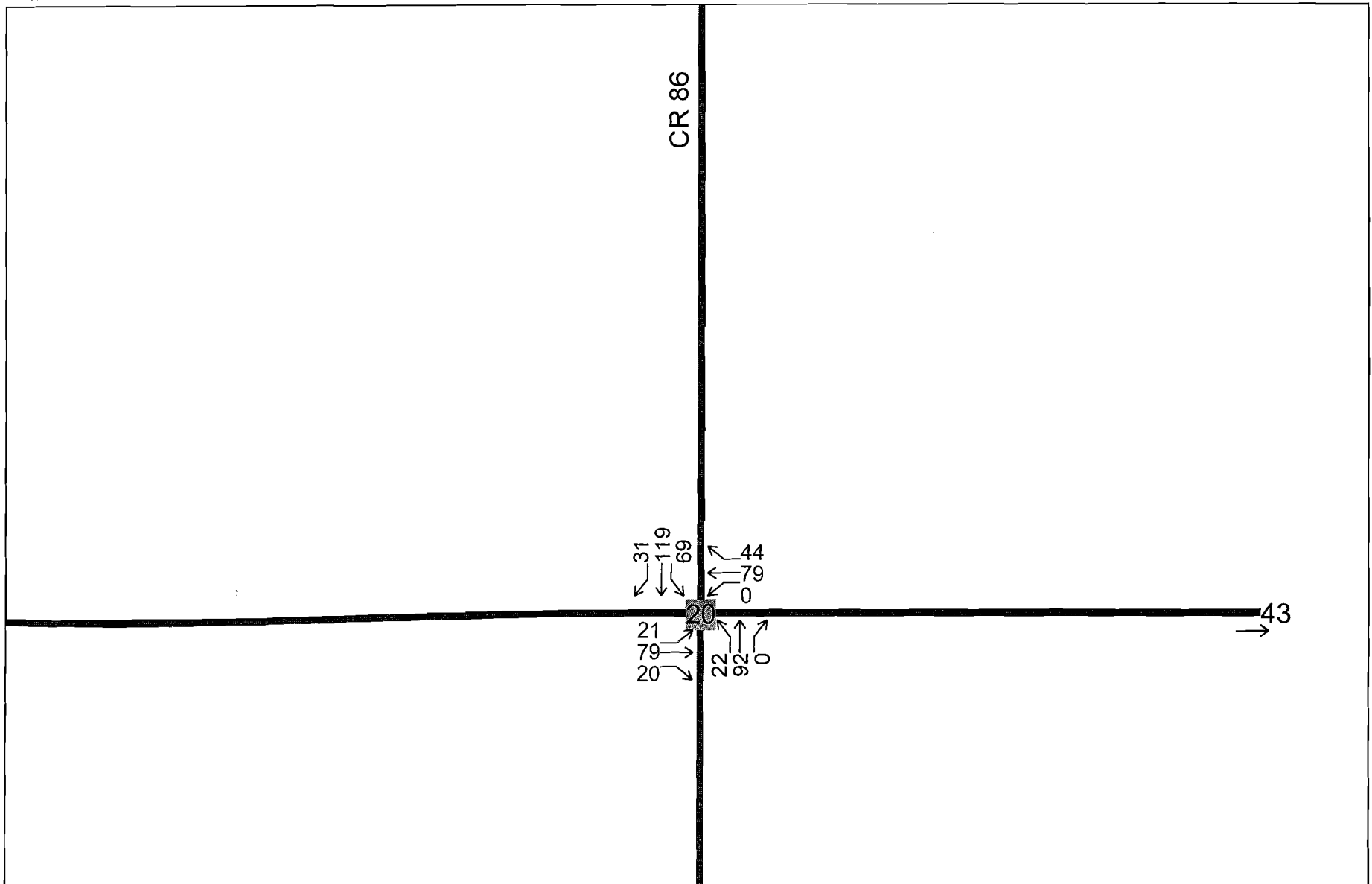




Full Build PM

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## **AIR QUALITY ANALYSIS: Vehicle-Related Air Emissions**

### **Methodology and Assumptions**

Motor vehicle air quality issues are most frequently associated with carbon monoxide (CO) emissions and the concentrations of those emissions. The MPCA's 1-hour and 8-hour standards for CO concentrations are 30 parts per million (ppm) and 9 ppm, respectively.

Concentrations of CO are generally highest at intersections with poor levels of service and, consequently, more idling vehicles. An air quality analysis was performed to predict carbon monoxide concentrations at the worst performing intersections in the proposed area. The air quality analysis incorporates projected afternoon peak hour traffic volumes (including site-generated traffic) representing conditions for the year 2007. Carbon monoxide concentrations were projected using the Environmental Protection Agency (EPA) Mobile 6 emission model and the CAL3QHC dispersion model.

As described in the traffic study, ten key intersections within the project area were analyzed to determine levels of service. Carbon monoxide analysis was performed at the worst operating intersection. The intersection of TH 22 and CSAH 17 was selected as a "worst case" intersection because this intersection operates at a lower level of service than the others in the study area.

The modeling assumptions used in this analysis were as follows:

|                                |   |
|--------------------------------|---|
| Analysis Year:                 | 2007                                    |
| Traffic Mix:                   | National default values                 |
| Cruise Speed:                  | Posted speed limits                     |
| Cold Start Percentage:         | 20.6 percent for all traffic            |
| Hot Start Percentage:          | 27.3 percent for all traffic            |
| Wind Speed:                    | 1 meter/second                          |
| Temperature:                   | -8.8 degrees Celsius                    |
| Surface Roughness:             | 108 centimeters                         |
| Stability Class:               | D                                       |
| Inspection Maintenance:        | No                                      |
| Oxygenated Fuel:               | Ethanol with 2.7 percent oxygen content |
| Fuel Program                   | Convention Gasoline East                |
| Fuel Reid Vapor Pressure       | 9.0 lbs/square inch                     |
| Eight Hour Persistence Factor: | 0.7                                     |
| Wind Direction:                | 36 directions at 10 degree intervals    |

## Background CO Levels

Default Background CO concentrations were obtained from the Minnesota Pollution Control Agency. For purposes of the analysis, these background concentrations were adjusted for region-wide increases in traffic volumes. To represent worst-case conditions, there were no reductions of background concentrations to account for vehicle emissions and temperature. The results are summarized in Table 1.

**TABLE 1**  
**CALCULATION OF CO BACKGROUND CONCENTRATIONS**

| Factor   | 2007           |                |
|--|----------------|----------------|
|  | 1-Hour Average | 8-Hour Average |
| MPCA Default 2006 Background Concentration (ppm) | 3.0            | 2.0            |
| Background Traffic Volume Adjustment Factor      | 1.03           | 1.03           |
| Worst-Case Background Concentration (ppm)        | 3.1            | 2.1            |

## Carbon Monoxide Modeling Results

Future CO concentrations are analyzed based on peak hour traffic volumes, optimized signal timing, and proposed intersection geometrics. Analyses were performed for the year 2007.

The sidewalk averaging technique was used to predict the average CO concentration along each sidewalk adjacent to the analyzed intersection. Receptors are placed parallel to each leg of the intersection along each sidewalk at 10 meters and 50 meters from the intersection. The average of the two receptors is considered the average concentration for that sidewalk. The listed result shows the maximum of the eight sidewalks adjacent to the intersection.

Table 2 presents the worst-case CO concentrations at the modeled intersection. The wind direction column indicates the wind direction that resulted in the worst-case conditions for that analysis location and time. The 1-hour and 8-hour average modeling results are below the state standards for all conditions modeled.

**TABLE 2**  
**FUTURE MODELED CARBON MONOXIDE CONCENTRATIONS**  
**(IN PARTS PER MILLION OR PPM)**

|   | 1-Hour Average | 8-Hour Average | Wind Direction <sup>(1)</sup> |
|---|----------------|----------------|-------------------------------|
| TH 22 and CSAH 17                       |                |                |                               |
| <i>Modeled CO Concentration</i>         | 1.1            | 0.8            |                               |
| <i>Background CO Concentration</i>      | 3.1            | 2.1            |                               |
| <i>Total Predicted CO Concentration</i> | <b>4.2</b>     | <b>2.9</b>     | <b>140</b>                    |
| <b>State Standards</b>                  | <b>30.0</b>    | <b>9.0</b>     |                               |

(1) Degrees from North

## Conclusions

Based upon the traffic analysis and CO analysis, the East Mankato development will not result in adverse impacts to air quality. The CO analysis considered the broader, cumulative effects of anticipated development and the resulting traffic congestion.

Predicted CO concentrations at the analyzed intersection will be below state standards in 2007. Because this intersection is the worst case intersection in terms of level of service and total delay, CO concentrations at other intersections in the study area would likely be lower than that predicted at the analyzed intersection.

SRF No. 0065729

**MEMORANDUM**

TO: Doug Losee, I & S Engineers and Architects, Inc.

FROM: Brett Danner, Senior Analyst  
Christine Paulu, Environmental Analyst

DATE: December 19, 2006

SUBJECT: MANKATO EAST ALTERNATIVE URBAN AREAWIDE REVIEW (AUAR)  
TRAFFIC NOISE ANALYSIS

SRF Consulting Group, Inc. completed a traffic noise analysis as part of the Mankato East Alternative Urban Areawide Review (AUAR). This traffic noise analysis focuses on impacts to existing residential locations surrounding the AUAR development area, as well as predicting future noise levels at selected planned residential land uses within the AUAR development area.

**24. ODORS, NOISE AND DUST**

Will the project generate odors, noise or dust during construction or during operation? ☒ Yes ☐ No

**If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)**

***AUAR:** Dust, odors, and construction noise need not be addressed in an AUAR, unless there is some unusual reason to do so. The RGU might want to discuss as part of the mitigation plan, however, and dust control or construction noise ordinances in effect.*

*If the area will include or adjoin major noise sources a noise analysis is needed to determine if any noise levels in excess of standards would occur, and if so, to identify appropriate mitigation measures. With respect to traffic-generated noise, the noise analysis should be based on the traffic analysis of item 21.*



**Odors and Dust During Construction**

The proposed project is not anticipated to generate any unusual odors during construction. Dust normal to construction will occur as a result of the proposed AUAR development. Dust generated during construction would be minimized through standard dust control measures such as watering. After construction is complete, dust levels are anticipated to be minimal because previously exposed soil surfaces will be in permanent cover (e.g., impervious surface or vegetated areas).

**Construction Noise**

The noise levels that may be experienced near a construction zone depend upon:

- The distance between the construction equipment and the receiver;
- The type of construction equipment in use;
- The percentage of time that the construction equipment attains its peak noise level; and
- Noise control features incorporated into the construction equipment.

Construction noise would be limited to daytime hours consistent with City ordinances. Construction equipment would be fitted with mufflers, which would be maintained during the construction process.

**Traffic Noise**

After project construction, the potential sources of noise from the proposed AUAR development, based on future land use assumptions, are limited to traffic noise. Traffic noise is a common source of noise in a developed setting and is regulated in Minnesota by the Minnesota Pollution Control Agency (MPCA) under Minnesota Statute 116.07 Subd. 2 and 4.

The proposed AUAR development is located in a currently undeveloped setting; however, adjacent lands are developed including residential and commercial land uses to the west, and industrial land uses to the north. Rural/agricultural land uses are located to the south and east of the proposed AUAR development. High volume roads such as US 14, TH 22, and TH 83 also pass near the AUAR development area. Vehicle traffic is the major noise source for receptors adjacent to these roadways.

A noise analysis was completed to assess existing noise levels in the project area and to determine what effect the proposed AUAR development would have on future noise levels. The analysis consisted on monitoring and modeling existing noise levels and predicting future noise levels using computer models. Noise analysis was conducted for existing (year 2006), year 2030 No Build and year 2030 Build traffic conditions. The traffic noise models for the year 2030 Build conditions were based on land use scenarios that were anticipated to generate the highest traffic volumes, and therefore represent the worst-case conditions in regards to traffic noise.

### Background/Regulatory Framework

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic increase in sound energy relative to a reference energy level. A sound increase of 3 dB is barely perceptible to the human ear, a 5 dB increase is clearly noticeable, and a 10 dB increase is heard as twice as loud. For example, if the sound energy is doubled (i.e., the amount of traffic doubles), there is a 3 dB increase in noise, which is just barely noticeable to most people. If traffic increases 10 times the sound energy level over a reference level, then there is a 10 dB increase and it is heard as twice as loud.

To approximate the way that an average person hears sound, an adjustment, or weighting, of the high- and low- pitched sounds is made. The adjusted sound levels are stated in units of “A-weighted decibels” (dBA). Traffic noise is variable and it is therefore best measured and regulated using statistical descriptors. These descriptors are denoted as  $L_x$ , with the x indicating a percentage of a time period that a noise level is exceeded. In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hours of the day and/or night that have the heaviest traffic. These noise levels are identified as the  $L_{10}$  and  $L_{50}$  levels. For example, an  $L_{10}$  value of 65 decibels means that the noise level was at or greater than 65 decibels during 10 percent of the measurement period (i.e., more than 6 minutes per hour). Common noise levels from various indoor and outdoor sources are listed below.

| Sound Pressure Level (dBA) | Noise Source               |
|----------------------------|----------------------------|
| 140-----                   | Jet Engine (at 75 feet)    |
| 130-----                   | Jet Aircraft (at 300 feet) |
| 120-----                   | Rock and Roll Concert      |
| 110-----                   | Pneumatic Chipper          |
| 100-----                   | Jointer/Planer             |
| 90 -----                   | Chainsaw                   |
| 80 -----                   | Heavy Truck Traffic        |
| 70 -----                   | Business Office            |
| 60 -----                   | Conversational Speech      |
| 50 -----                   | Library                    |
| 40 -----                   | Bedroom                    |
| 30 -----                   | Secluded Woods             |
| 20 -----                   | Whisper                    |

Source: “A Guide to Noise Control in Minnesota,” Minnesota Pollution Control Agency, <http://www.pca.state.mn.us/programs/pubs/noise.pdf> and “Highway Traffic Noise,” FHWA, <http://www.fhwa.dot.gov/environment/htnoise.htm>.

Minnesota State noise standards have been established for daytime and nighttime periods. The MPCA defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00 p.m. to 7:00 a.m. Daytime peak traffic volumes coincide with the morning and evening rush hours (typically 7:00 to 8:00 a.m. and 4:00 to 5:00 p.m.).

For residential land uses (identified as Noise Area Classification 1 or NAC-1), the Minnesota State standards for  $L_{10}$  are 65 dBA for daytime and 55 dBA for nighttime; the standards for  $L_{50}$  are 60 dBA for daytime and 50 dBA for nighttime. All receptors modeled in this analysis are classified as NAC-1. State noise standards are shown in Table 1.

**TABLE 1**  
**MINNESOTA STATE NOISE STANDARDS**

| <b>MPCA State Noise Standards</b> |              |   |                |   |                |
|-----------------------------------|--------------|---|----------------|---|----------------|
| <b>Land Use</b>                   | <b>Code</b>  | <b>Daytime (7 a.m. – 10 p.m.)<br/>dBA</b> |                | <b>Nighttime (10 p.m. – 7 a.m.)<br/>dBA</b> |                |
| <b>Residential</b>                | <b>NAC-1</b> | $L_{10}$ of 65                            | $L_{50}$ of 60 | $L_{10}$ of 55                              | $L_{50}$ of 50 |
| <b>Commercial</b>                 | <b>NAC-2</b> | $L_{10}$ of 70                            | $L_{50}$ of 65 | $L_{10}$ of 70                              | $L_{50}$ of 65 |
| <b>Industrial</b>                 | <b>NAC-3</b> | $L_{10}$ of 80                            | $L_{50}$ of 75 | $L_{10}$ of 80                              | $L_{50}$ of 75 |

Minnesota Statute 116.07, Subd. 2a. states that municipal and county roads, except for roadways for which full control of access has been acquired, and for roads in the cities of Minneapolis and St. Paul, are exempt from State noise standards. Local (city and county) roadways considered with the AUAR development are exempt from State noise standards.

#### Noise Level Monitoring

Noise level monitoring is commonly performed during a noise study to document existing noise levels. Existing noise levels can be used as a “baseline” against which future scenarios are compared. In addition, when studying future noise levels projected with computer models, monitored noise levels for existing conditions are compared to modeled results for existing conditions to validate the computer modeling techniques and results.

Existing noise levels were monitored at two sites in the project area (receptors R2 and R8; see Figure 1) chosen to represent areas of outdoor human activity (i.e., existing residential yards). Noise levels were monitored on October 19, 2006 between the hours of 6:00 a.m. to 7:00 a.m. (nighttime) and 8:00 a.m. to 11:00 a.m. (daytime). Monitored levels ( $L_{10}$ ) were within 2 dBA of modeled levels, as shown in Tables 2 and 3 below.

### Noise Modeling

Noise modeling was done using the noise prediction program “MINNOISE,” a version of the Federal Highway Administration (FHWA) noise model “STAMINA” adapted by Mn/DOT and approved by the MPCA. The model uses vehicle numbers, speed, class of vehicle, and the typical characteristics of the roadway being analyzed. The computations for the proposed improvements were based on existing and projected traffic volumes, existing and proposed traffic speeds, and vehicle class percentages. The vehicle class percentages used for all roads were as follows: automobiles and light trucks, 97 percent; medium trucks, 2 percent; and heavy trucks, 1 percent. Noise modeling was completed using a “flat-earth model” to estimate noise levels as a worst-case scenario.

Traffic noise analyses are typically conducted for the peak noise hour during both daytime and nighttime. However, peak noise levels do not always correspond to peak traffic hours. This is the case when increased congestion during peak hours causes reduced speeds. Level of service (LOS) C conditions is considered to represent peak traffic noise conditions. The noise models for this analysis assumed that all roadways operated at level of service C or better under peak hour existing conditions. For future No Build and Build conditions, the noise models assumed that future improvements have been incorporated into the roadway network and that all roadways operated at level of service C or better under peak hour conditions.

Traffic noise was modeled at 10 locations within the project area (see Figure 1). Four of these 10 locations (receptors R1, R3, R4, and R5) represent proposed residential land uses with the AUAR development. Land use at these locations is currently agricultural. Receptor R1 represents a proposed residential land use adjacent to TH 22, an existing high volume roadway. Receptors R3, R4, and R5 represent locations within the AUAR study area adjacent to future roadways (CSAH 12; Bassett Drive; Hoffman Road) constructed with the AUAR development.

Noise monitoring and modeling results for existing (year 2006) conditions and No Build and Build daytime traffic noise conditions are presented in Table 2. Nighttime peak noise levels are shown in Table 3.

### Summary of Traffic Noise Modeling Results

- Existing (2006) daytime noise levels range from 57 dBA to 67 dBA ( $L_{10}$ ). Existing nighttime (2006) noise levels range from 56 dBA to 66 dBA ( $L_{10}$ ).
- Increases in daytime traffic noise from existing (2006) to future (2030) No Build conditions range from 0 to 3 dBA ( $L_{10}$ ). Increases in nighttime traffic noise from existing (2006) to future (2030) No Build conditions range from 0 to 4 dBA ( $L_{10}$ ). The greater increases in nighttime noise levels at Receptors R7 and R8 (4 dBA [ $L_{10}$ ]) are due to increased traffic along CR 86.



**TABLE 2**  
**NOISE MONITORING AND MODELING RESULTS – DAYTIME**

| Receptor               | Monitored       |                 | Existing<br>(year 2006) |                 | No-Build<br>(year 2030) |                 | Build<br>(year 2030) |                 |
|------------------------|-----------------|-----------------|-------------------------|-----------------|-------------------------|-----------------|----------------------|-----------------|
|                        | L <sub>10</sub> | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>      | L <sub>50</sub> |
| R1 <sup>(1)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>72</b>            | <b>66</b>       |
| R2                     | <b>66</b>       | 57              | <b>67</b>               | 58              | <b>69</b>               | 60              | <b>72</b>            | <b>65</b>       |
| R3 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>70</b>            | <b>63</b>       |
| R4 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | 65                   | 57              |
| R5 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | 65                   | 57              |
| R6                     |                 |                 | 57                      | 50              | 57                      | 50              | 59                   | 53              |
| R7                     |                 |                 | 65                      | 55              | <b>68</b>               | 59              | <b>69</b>            | 60              |
| R8                     | <b>66</b>       | 48              | 65                      | 55              | <b>68</b>               | 59              | <b>69</b>            | 60              |
| R9                     |                 |                 | 60                      | 52              | 60                      | 52              | 62                   | 55              |
| R10                    |                 |                 | 62                      | 58              | 65                      | <b>61</b>       | <b>66</b>            | <b>62</b>       |
| <b>State Standards</b> | <b>65</b>       | <b>60</b>       | <b>65</b>               | <b>60</b>       | <b>65</b>               | <b>60</b>       | <b>65</b>            | <b>60</b>       |

**Bold** numbers exceed State noise standards.

<sup>(1)</sup> Receptor R1 represents a proposed residential land use within the AUAR development and was modeled only under Build conditions. Receptor R1 is located in an undeveloped area adjacent to TH 22.

<sup>(2)</sup> Receptors R3, R4, and R5 represent proposed residential land uses with the AUAR development and were modeled only under Build conditions. These areas are currently undeveloped and were assumed to remain undeveloped under future No Build conditions.

**TABLE 3**  
**NOISE MONITORING AND MODELING RESULTS – NIGHTTIME**

| Receptor               | Monitored       |                 | Existing<br>(year 2006) |                 | No-Build<br>(year 2030) |                 | Build<br>(year 2030) |                 |
|------------------------|-----------------|-----------------|-------------------------|-----------------|-------------------------|-----------------|----------------------|-----------------|
|                        | L <sub>10</sub> | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>         | L <sub>50</sub> | L <sub>10</sub>      | L <sub>50</sub> |
| R1 <sup>(1)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>71</b>            | <b>65</b>       |
| R2                     | <b>67</b>       | <b>60</b>       | <b>66</b>               | <b>57</b>       | <b>68</b>               | <b>59</b>       | <b>72</b>            | <b>64</b>       |
| R3 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>70</b>            | <b>62</b>       |
| R4 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>64</b>            | <b>56</b>       |
| R5 <sup>(2)</sup>      |                 |                 | --                      | --              | --                      | --              | <b>65</b>            | <b>56</b>       |
| R6                     |                 |                 | <b>56</b>               | 49              | <b>57</b>               | 49              | <b>58</b>            | <b>52</b>       |
| R7                     |                 |                 | <b>64</b>               | <b>54</b>       | <b>68</b>               | <b>59</b>       | <b>68</b>            | <b>59</b>       |
| R8                     | <b>66</b>       | <b>50</b>       | <b>64</b>               | <b>54</b>       | <b>68</b>               | <b>59</b>       | <b>68</b>            | <b>59</b>       |
| R9                     |                 |                 | <b>59</b>               | <b>51</b>       | <b>59</b>               | <b>51</b>       | <b>61</b>            | <b>54</b>       |
| R10                    |                 |                 | <b>62</b>               | <b>57</b>       | <b>64</b>               | <b>60</b>       | <b>65</b>            | <b>62</b>       |
| <b>State Standards</b> | <b>55</b>       | <b>50</b>       | <b>55</b>               | <b>50</b>       | <b>55</b>               | <b>50</b>       | <b>55</b>            | <b>50</b>       |

**Bold** numbers exceed State noise standards.

<sup>(1)</sup> Receptor R1 represents a proposed residential land use within the AUAR development and was modeled only under Build conditions. Receptor R1 is located in an undeveloped area adjacent to TH 22.

<sup>(2)</sup> Receptors R3, R4, and R5 represent proposed residential land uses with the AUAR development and were modeled only under Build conditions. These areas are currently undeveloped and were assumed to remain undeveloped under future No Build conditions.

- Increases in traffic noise between year 2030 No Build and year 2030 Build conditions range from 1 to 3 dBA for daytime levels, and range from 0 to 4 dBA for nighttime levels. A 3 dBA increase in noise is the human threshold of perceptible changes in sound. Differences in exterior noise levels would be barely perceptible to residents at Receptor R2, and would be imperceptible to non-existent to residents at the other modeled receptor locations.
- Noise levels ( $L_{10}$ ) at Receptor R2 currently exceed State daytime noise standards for NAC-1 receptors, and would continue to do so under both future No Build and Build conditions. Receptors R7 and R8 do not currently exceed State daytime noise standards ( $L_{10}$ ), but would do so under both future No Build and Build conditions. Receptor R10 would exceed State daytime noise standards under Build conditions only.
- Nighttime noise standards are currently exceeded at all modeled receptors; noise levels would exceed State nighttime noise standards with both the future No Build and Build scenarios. Violation of the more stringent nighttime standard is common because the “nighttime” period includes the 6:00 am to 7:00 am period, which is the beginning of the morning rush hour.
- Future noise levels at proposed residential land uses in the AUAR development area under the modeled Build scenario are anticipated to meet or exceed State daytime and nighttime noise standards at receptor locations adjacent to existing and future roadways.

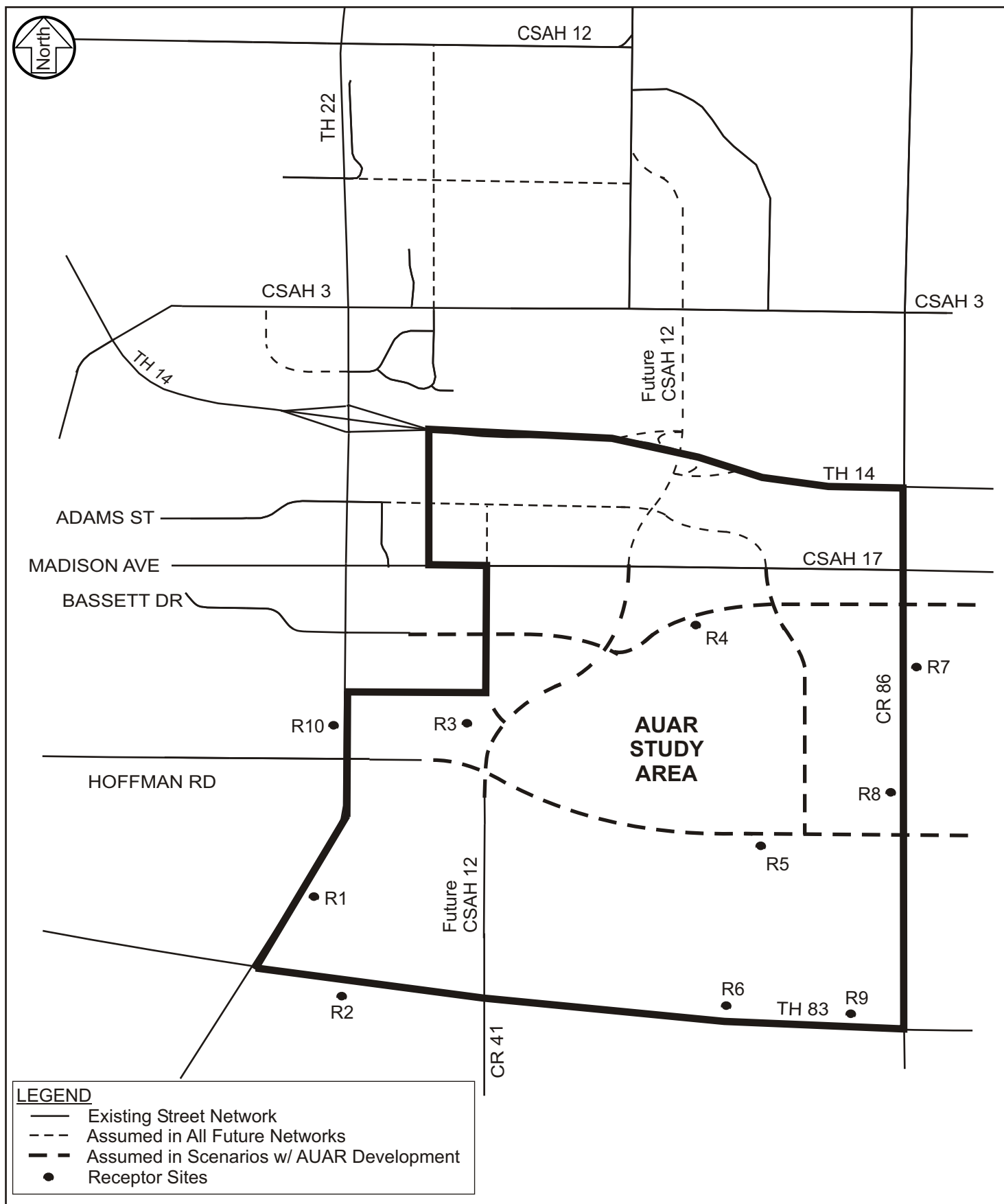
### **Conclusions**

As previously stated, it takes a doubling of traffic volumes to result in a barely perceptible (3 dBA) increase in noise. For most modeled receptors, traffic volumes will increase under both No Build and Build conditions; however, this increase in traffic volumes would result in an increase in noise levels of less than 3 dBA and would be imperceptible to residents at these locations.

Traffic increases on TH 83 between No Build and Build conditions near Receptor R2 are anticipated to result in noise increases of 3 and 4 dBA ( $L_{10}$ ) for daytime and nighttime noise levels, respectively. Under the worst-case Build scenario modeled as part of this analysis, traffic volumes are anticipated to more than double on TH 83 over No Build volumes during the peak hours. Consequently, the difference in noise levels between future No Build and Build conditions would be approaching the threshold of a perceptible (5 dBA) increase in noise at this location.

Future traffic noise levels at proposed residential land uses within the AUAR development are anticipated to meet or exceed State daytime and nighttime noise levels. These receptors were located immediately adjacent to the future AUAR development roadways. In order for the proposed land uses at these locations to avoid exceeding State noise standards, it is recommended that future residential areas consider site plan elements to reduce noise levels. Examples of site plan elements that could reduce noise on residential developments include berms, fencing, vegetative screening, and increased setbacks. An example of land use elements

that could reduce noise on residential developments is commercial land uses directly adjoining the roadway, with residential land uses behind the commercial uses. Commercial buildings directly adjoining the roadway would block some traffic noise for residential receptors, as well as increasing the distance between the roadway and residences, and result in levels meeting State standards at areas closer to the roadway.



**APPENDIX F.**  
**Natural Resources Assessment Inventory**





*One  
Firm*

# Greater East Mankato Infill Service District Mankato, Minnesota

## Natural Resources Assessment Inventory

January 2007

*Prepared by:*

Project Number: 06-9293



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# Natural Resources Assessment Inventory

## Greater East Mankato Infill Service District (GEMISD) Mankato, Minnesota

### Land Cover Type Classification

#### Evaluation and Study Methods

As part of the GEMISD AUAR process a land cover classification inventory has been completed for the 2,100-acre project area. The Minnesota Land Cover Classification System (MLCCS) cover type category names and codes have been utilized in generating the Land Cover Types Map.

The inventory involved walk through surveys and plant community classifications when landowners were contacted and granted I&S permission to access the property. In some cases I&S was not able to gain permission to access the property, and other inventory methods were utilized to establish the predominate plant communities present. For inaccessible properties I&S utilized methods, such as: aerial photograph interpretation, National Wetland Inventory maps, Blue Earth County Soil Survey maps, road side visual surveys, and/or visual inventories from neighboring properties.

Land cover type boundaries displayed in the Land Cover Type Map are approximate, and are based on field surveys and the aerial photograph interpretation. Not all mapped plant communities have been surveyed by the walk through method, and further field investigation would be necessary to determine the most accurate plant community type within a given area. Based on the inventory completed by I&S 22 land cover types have been identified throughout the GEMISD AUAR project area. Below is the MLCCS code and cover type name given to the individual land cover types. A brief description providing general information about the various land cover types has been provided, which may include the following topics: hydrology, soils, dominate plant species, adjacent or fringe plant communities, human influences, and invasive species presences.

#### 14000 Artificial Surfaces with less than 25% Vegetative Cover

Areas that have been altered by human activity, and consist primarily of impervious surfaces, gravel, and/or buildings. Farmsteads are not included in this cover type as they tend to have greater than 25% vegetative cover.

#### 21100 Planted, Maintained, or Cultivated Coniferous Trees

Woodland areas dominated by white spruce, Colorado spruce, Eastern red cedar, white pine, and Scotch pine. Voluntary deciduous species consist of green ash and American elm. Typical herbaceous and vine species consist of Canada blue grass, Kentucky blue grass, reed canary grass, smooth brome, riverbank grape, Virginia creeper, black raspberry, and red raspberry. These areas have been planted for purposes such as tree farms and farmstead windbreaks, and some signs of minimal maintenance practices are evident.

#### 23100 Planted or Maintained Grasses with Sparse Trees

Typical landcover type for lawns. Maybe present on hydric or upland soils. Typical grass species include perennial rye, Canada blue grass, and Kentucky blue grass. Tree species maybe native or non-native cultivars, deciduous and coniferous, utilized for general landscaping purposes.

#### 24110 Upland Soils – Cultivated Row Cropland

Agricultural cropland typically planted with soybeans or corn. Areas mapped in the soil survey with upland soil types are included in this cover type.

#### 24120 Hydric Soils – Cultivated Row Cropland

Agricultural cropland typically planted with soybeans or corn. Areas mapped in the soil survey with hydric soil types are included in this cover type.

#### 24228 Hydric Soils – Close Grown Cropland (Hayfield)

Areas that have been planted with primarily introduced grasses, forbs, and legumes, and are actively being maintained for forage production. Typical plant species may include smooth brome grass, orchard grass, perennial rye, timothy, reed canary grass, white clover, red clover, and alfalfa.

#### 32150 Maple-Basswood Forest

Forested areas with a tree canopy typically dominated by American basswood and sugar maple. Other typical canopy species consist of green ash, American elm, slippery elm, bur oak, white oak, red oak, black cherry, and bitternut hickory. Small depressional areas may be dominated by silver maple, eastern cottonwood, green ash, and American elm. The shrub/sapling layer can consist of chokecherry, American plum, American elderberry, red elderberry, red-osier dogwood, grey dogwood, and young saplings of the dominant tree species present. Sites experiencing greater human impact may exhibit a greater dominance of European buckthorn, prickly gooseberry, and prickly ash within the shrub layer. Generally diverse herbaceous layers are present consisting of wild ginger, wild golden glow, three-lobed hepatica, wood nettle, woodland aster, zig-zag goldenrod, and bloodroot.

#### 32170 Altered/Non-native Deciduous Forest

Forested areas of this type are typically located higher in the landscape, and the soils are not typically inundated or saturated. Both hydrophytic and non-hydrophytic tree species can be present with this community. Communities within this group have been noticeably impacted by past human activities including; grazing, logging, general excavation, the introduction of invasive exotic species, etc. Former or abandon farmsteads have been included in this cover type.

Typically the canopy exhibits low species diversity; consisting of American elm, green ash, boxelder, Eastern cottonwood, Siberian elm, slippery elm, and American basswood. The typical shrub/sapling layer consists of European buckthorn, prickly ash, prickly gooseberry, tatarian honeysuckle and minimal canopy species saplings. The herbaceous

layer is generally dominated by European buckthorn, Virginia creeper, white snakeroot, and woodland violet.

#### 32200 Temporarily Flooded Deciduous Forest

Forested areas which are typically dominated by hydrophytic species, but non-hydrophytes may be present as non-dominates or may dominate the herbaceous layer. These areas may be forested wetlands, or flooding may be brief and the area may be upland forest.

Typical dominant canopy species consist of green ash, American elm, silver maple, and Eastern cottonwood. Non-dominant canopy species can consist of American basswood, slippery elm, sugar maple, white oak, quaking aspen, and minimal boxelder. The shrub layer is generally dominated by American elderberry, red-osier dogwood, and grey dogwood in areas inundated for longer durations. The shrub layer in areas of brief inundation are typically dominated by wild plum, chokecherry, red elderberry, and staghorn sumac. Herbaceous and vine species consist of riverbank grape, Virginia creeper, woodland aster, giant goldenrod, wild golden glow, jewelweed, woodland violet, wood nettle, and canopy species' seedlings.

#### 32220 Lowland Hardwood Forest

Forested areas located above the active floodplain, or within the inactive floodplain. Typical trees present are a combination of hydrophytic and non-hydrophytic species. Typical tree species dominating the upland portions of the community are American basswood, sugar maple, American elm, slippery elm, green ash, bur oak, white oak, and red oak. Typical tree species dominating the isolated forested wetlands within the community are American elm, Eastern cottonwood, quaking aspen, silver maple, and green ash. The shrub/sapling layer shows minimal occurrence of European buckthorn, prickly ash, tatarian honeysuckle, and prickly gooseberry. Variable age classes of the dominant canopy tree species are present.

#### 32240 Altered/Non-native Temporarily Flooded Deciduous Forest

Forested areas of this type are typically located adjacent to active floodplains, within and adjacent to forested wetlands, and adjacent to agricultural drainage ditches. Both hydrophytic and non-hydrophytic tree, shrub, and herbaceous species can be present with this community. Communities within this group have been noticeably impacted by past human activities including; grazing, logging, drainage ditch excavation, general excavation, etc.

Typically the canopy exhibits low species diversity; consisting of American elm, green ash, boxelder, Eastern cottonwood, silver maple, black willow, slippery elm, and American basswood. The typical shrub/sapling layer, when present, consists of European buckthorn, prickly ash, prickly gooseberry, tatarian honeysuckle and minimal canopy species saplings. The herbaceous layer tends to be dominated by wood nettle, stinging nettle, and reed canary grass in wetter areas with canopy openings. The herbaceous layer is generally dominated by European buckthorn, Virginia creeper, white snakeroot, and woodland violet in the areas that are rarely inundated or saturated.

#### 32340 Altered/Non-native Deciduous Forest – Saturated Soil

Forested areas dominated by black willow and Eastern cottonwood. The shrub layer is dominated by red-osier dogwood, grey dogwood, and sandbar willow. The groundwater table is typically at or near the soil surface for the majority of the growing season, and areas may be inundated early in the year and after large rainfall events. Forested areas of this type generally located adjacent to large wetland complexes, or adjacent to agricultural drainage ditches.

#### 52130 Non-native Dominated Upland Shrubland

Areas with greater than 50% coverage by shrub/saplings. These areas are dominated primarily by non-hydrophytic, non-native shrub species. Primary shrub species consist of European buckthorn, tatarian honeysuckle, and staghorn sumac. Occasional trees present include American basswood, Eastern cottonwood, and green ash. The herbaceous layer is comprised mostly of the species dominating the shrub layer.

#### 61220 Medium – Tall Altered/Non-native Dominated Grassland

Grasslands that have been planted/seeded, but are not maintained for agricultural purposes such as; hayfields and/or pasturelands. Dominant grass species are a mixture of hydrophytic and non-hydrophytic species; Canada bluegrass, Kentucky bluegrass, timothy, reed canary grass, smooth brome and redtop. The forbs generally consisted of giant goldenrod, tall goldenrod, stiff goldenrod, sawtooth sunflower, dogbane, grey headed coneflower and blue vervain. Woody vine and woody herbaceous species present in this type of grassland consist of Virginia creeper, riverbank grape, and poison ivy. Shrub/sapling cover was less than 30%. Shrub and sapling species present consist of red-osier dogwood, grey dogwood, wild plum, green ash, American elm, European buckthorn, and Eastern red cedar.

#### 61330 Temporarily Flooded Altered/Non-native Dominated Grassland

These grasslands are located on hydric soils, and are typically dominated by hydrophytic species. These areas are typically wetland or wetland/upland transitional areas which are inundated early in the growing season or after large rain events. Reed canary grass is typically the dominate grass species present within these grasslands. Other herbaceous species present may include redtop, narrowleaf cattail, Kentucky bluegrass, prairie cordgrass, giant goldenrod, rice cut grass, smartweed, barnyard grass, spike rush, and various sedge species.

#### 61480 Saturated Altered/Non-native Herbaceous Vegetation

These plant communities are located on hydric soils, and are dominated by hydrophytic species. These areas are wetland which are primarily saturated to the soil surface for most of the growing season, and inundated early in the growing season or after large rain events. Reed canary grass is typically the dominate grass species present within these communities. Other herbaceous species present may include redtop, narrowleaf cattail, prairie cordgrass, giant goldenrod, rice cut grass, smartweed, barnyard grass, lake sedge, spike rush, dark green bulrush, river bulrush, yellow nut sedge, tussock sedge and slough



sedge. Shrub/saplings typically present include American elm, green ash, black willow, sandbar willow, red-osier dogwood, and grey dogwood.

#### 61520 Mixed Emergent Marsh – Seasonally Flooded

Seasonally flooded emergent marshes are located on organic soils, and are dominated by hydrophytic species that can withstand extended periods of inundation. Seasonally flooded marsh habitats are inundated with 6 to 12 inches of water for the majority of the growing season. This land cover type may experience a draw down, and will be saturated to the soil surface during dry periods of the year. Inundation tends to reoccur after small rainfall events. The dominant herbaceous species may include lake sedge, water smartweed, and tussock sedge. Transitional or fringe species consist of great blue lobelia, blue flag iris, prairie cord grass, spikerush, bumble weed, and narrowleaf cattail.

#### 61530 Seasonally Flooded Altered Non-native Dominated Herbaceous Vegetation

Seasonally flooded wetlands are located on organic soils, and are dominated by hydrophytic species that can withstand extended periods of inundation. Seasonally flooded marsh habitats are inundated with 6 to 12 inches of water for the majority of the growing season. This land cover type may experience a draw down, and will be saturated to the soil surface during dry periods of the year. Inundation tends to reoccur after small rainfall events. Narrowleaf cattail is the typical dominant herbaceous species. Transitional or fringe species consist of reed canary grass, smartweed, yellow nut sedge, stinging nettle, and redtop.

#### 61630 Semipermanently Flooded Altered/Non-native Herbaceous Vegetation

Semipermanently flooded herbaceous habitats are located on deep organic soils, and inundation (up to 3 feet of water) generally occurs throughout much of the growing season. This land cover type is typically dominated by monotypical stands of narrowleaf or hybrid cattails with low diversity understory. Other non-dominant species tend to include; lake sedge, dark green bulrush, soft stem bulrush, river bulrush, spike rush, swamp milkweed, and water smartweed.

#### 62000 Grassland with Sparse Trees

This cover type varies greatly in species composition, and are generally the result of past human activity; such as former pasturelands or lands enrolled in federal conservation programs. The species composition is typically a mixture of hydrophytes and non-hydrophytes depending on topographic location and hydrology. These areas are a mixture of wetland and upland areas. Typical dominant grass species are switchgrass, smooth brome, Canada blue grass, redtop, reed canary grass, orchard grass, timothy, and perennial rye grass. Forb species present consist of tall goldenrod, giant goldenrod, Canada goldenrod, smartweed, alfalfa, red clover, and white clover. Tree species consist of green ash and Eastern red cedar.

62140 Non-native Dominated Herbaceous Vegetation with Sparse Deciduous Trees

Grassland dominated by non-native non-hydrophytic grasses. The groundwater table appears to be below the soil surface throughout the entire year, and wetland hydrology does not exist throughout the plant community. Dominate grasses consist of smooth brome, Canada blue grass, Kentucky blue grass, and timothy. Giant goldenrod, tall goldenrod, Canada goldenrod, panicled aster, heath aster, common dandelion, wild parsnip, Virginia creeper and giant ragweed are common non-dominate species. The sparse deciduous trees and shrubs are green ash, red-osier dogwood, staghorn sumac, Eastern red cedar, and wild plum.

93300 Palustrine Open Water

Deep water wetland with minimal to no emergent growth, and inundation is present year round with normal precipitation. This habitat type may be naturally occurring, or the result of human activity; such as wetland excavation.

**Table 1. Existing Cover Types**

| <b>Number</b>                               | <b>Cover Type Classification</b>                                       | <b>Acres Before Development</b> |
|---|--|---------------------------------|
| <b>Agricultural</b>                         |  |                                 |
| 24110                                       | Upland Soils – Cultivated Row Cropland                                 | 170.52                          |
| 24120                                       | Hydric Soils – Cultivated Row Cropland                                 | 1368.9                          |
| 24228                                       | Hydric Soils – Close Grown Cropland (Hayfield)                         | 36.56                           |
| <b>Residential &amp; Impervious Surface</b> |  |                                 |
| 14000                                       | Artificial Surfaces with less than 25% Vegetative Cover                | 4.4                             |
| 21100                                       | Planted, Maintained, or Cultivated Coniferous Trees                    | 9.3                             |
| 23100                                       | Planted or Maintained Grasses with Sparse Trees                        | 82.17                           |
| <b>Grasslands</b>                           |  |                                 |
| 61220                                       | Medium – Tall Altered/Non-native Dominated Grassland                   | 2.85                            |
| 61330                                       | Temporarily Flooded Altered/Non-native Dominated Grassland             | 32.64                           |
| 62000                                       | Grassland with Sparse Trees  | 23.8                            |
| 62140                                       | Non-native Dominated Herbaceous Vegetation with Sparse Deciduous Trees | 6.9                             |
| <b>Shrublands</b>                           |  |                                 |
| 52130                                       | Non-native Dominated Upland Shrubland                                  | 1.01                            |
| <b>Woodlands</b>                            |  |                                 |
| 32150                                       | Maple-Basswood Forest  | 36.8                            |
| 32170                                       | Altered/Non-native Deciduous Forest                                    | 19.94                           |
| 32200                                       | Temporarily Flooded Deciduous Forest                                   | 37.75                           |
| 32220                                       | Lowland Hardwood Forest  | 43.85                           |
| 32240                                       | Altered/Non-native Temporarily Flooded Deciduous Forest                | 15.3                            |
| 32340                                       | Altered/Non-native Deciduous Forest – Saturated Soil                   | 8.7                             |
| <b>Wetlands/Open Water</b>                  |  |                                 |
| 61480                                       | Saturated Altered/Non-native Herbaceous Vegetation                     | 58.41                           |
| 61520                                       | Mixed Emergent Marsh – Seasonally Flooded                              | 0.44                            |

|              |   |                         |
|--------------|---|-------------------------|
| 61530        | Seasonally Flooded Altered Non-native Dominated Herbaceous Vegetation | 35.31                   |
| 61630        | Semi-permanently Flooded Altered/Non-native Herbaceous Vegetation     | 1.22                    |
| 93300        | Palustrine Open Water   | 12.49                   |
| <b>TOTAL</b> |   | <b>~2,100<br/>acres</b> |

Refer to the Cover Type Map located at the back of this report, which illustrates the land cover types identified within the GEMISD project area.

### **Wildlife, Fish, and Ecologically Sensitive Resources**

In general the largest impact to wildlife within the project area will come in the form of habitat loss and habitat fragmentation as land development occurs. This loss and fragmentation have been taken into consideration during the planning phases of this AUAR, and large “habitat corridors” have been left intact to allow wildlife species to move through the areas with minimal human exposure.

Larger habitat areas will reduce the “edge effect” within specific cover types; in particular woodlands and forests. A number of woodland wildlife species are specialists and prefer to inhabit the interior portions of the woodlands and forests. The interior portions of the woodlands and forests in larger wooded tracts are less likely to be inhabited by the generalist wildlife species, which because of their highly competitive nature will outcompete more specialized wildlife species near the edges of the woodland. The zone at which the edges of two or more habitat types come together is referred to as an ecotone. Ecotones tend to be high in plant and wildlife diversity, but are typically occupied by more generalist and highly adaptive species. Specialists species tend to out compete these generalist species as you move out of the ecotones, and towards the interior of a particular habitat type.

Some wildlife species will experience vary little decline, and possibly increase in abundance due to development. In general a number of passerine bird species are will adapted to change, and can thrive in urban settings. These species include; American robins, American crows, common pigeons, European starlings, common sparrow, and the common grackle. Local Canada geese populations may increase with the addition of short grass lawns, which are ideal for feeding. Mammal species such as plains pocket gophers and thirteen-lined ground squirrels may also benefit from an increase in short grass lawns.

Focusing road placement to the fringes of large established wetland complexes will assist in keeping reptile and amphibian habitat intact and reduce the impacts of the roads on their populations. Roads can impose significant barriers to the movement of reptiles and amphibians, and these barriers can result in a population decline if a significant number of animals are killed by automobiles.

The GEMISD AUAR area includes 22 individual cover types based on the Minnesota Land Cover Classification System (MLCCS) developed by the Minnesota Department of Natural Resources (MN DNR). Due to the adaptive ability of various wildlife species, the 22 cover types have been focused into six general wildlife habitat types including; Woodland/Forest, Lawn/Short Grass, Cropland, Herbaceous Wetland/Open Water, Shrubland, and Grassland.

### **Wildlife Habitat Types**

Woodland/Forest: The Woodland/Forest habitat category refers to a variety of primarily deciduous woodland and forest cover types identified within the AUAR area. All woodland and forest habitats supply cover for a number of wildlife species. Woodlands with greater plant species diversity and greater vertical diversity will provide higher quality wildlife habitat. Woodlands and forests with higher tree species diversity will provide a more stable forage base for the wildlife species present. Areas with multi-level vertical structure vs. minimal vertical structure habitats (i.e. habitat with herbaceous, shrubs, samplings, and upper canopy vs. habitat with only herbaceous and upper canopy) will provide greater cover availability for more wildlife species.

Lawn/Short Grass: The lawn/short grassland areas are introduced grass and legumes. The short grasslands refer to hay or pasture lands. Some wildlife species benefit from these areas, and period disturbance of mowing tends to encourage the presence of these species. Generally short grasslands habitat types provide good nesting cover and forage areas for grounding nesting bird species, but if mowing is too frequent during the nesting season (Mid April – August) the use of these habitats will be of minimal significance.

Cropland: Agricultural land can serve as a temporary cover and food source for numerous species of wildlife. The benefits of agricultural ground to wildlife is dependent upon the presence of other permanent habitat types mixed within the cropland.

Herbaceous Wetland/Open Water: Wetlands serve as a source of water and food for almost every wildlife species. Amphibian species present within the AUAR area are completely dependent upon the presence and quality of the various wetland communities. Wetland communities provide cover to a number of different species throughout the year; as the hydrologic conditions change, so will the wildlife species present. During the wet portion of the growing certain herbaceous wetland types are inundated and provide habitat for amphibians and waterfowl. Later in the growing season that same wetland may experience a “draw down”, and the resulting conditions of little or no water will be ideal for various mammals and bird species to take advantage of the cover and forage base.

Shrubland: The scrub-shrublands present within the AUAR area are primarily dominated by non-native species within the shrub layer and/or the herbaceous layer where present. These areas provide cover and forage for various wildlife species, but the dominance by non-native species limits the quality of these habitat areas.

Grassland: The wildlife species that occupy the grassland habitats will vary depending on the dominant vegetative cover. Areas of greater native grass and forb diversity will provide greater wildlife benefit by producing a wider variety of seeds and by attracting a greater forage base of insects for small mammals and ground nesting birds. This increase in potential prey species will lead to greater utilization of the habitat by predator species. Areas dominated by introduced grass species will tend to be a monotypical grass species community with minimal forage and cover potential.

Refer to the Land Cover Type Classification section of this report for a detailed description of the cover types present within the AUAR area, and the methods used to identify the cover types. The table that follows identifies the wildlife species that may utilize the habitat types within the AUAR area. Wildlife species identified during the walk through surveys conducted by I&S have been indicated with grey shading.

### **Fish**

The AUAR area includes some intermittent streams and agricultural drainage ditches which could potentially support fish species. However, due to poor water quality from agricultural runoff and the intermittent nature of these streams and ditches, the diversity and number of fish species is most likely limited to more tolerant minnow species. Some of these potential species may include the common shiner, white sucker, and common creek chub.

### **Wildlife**

A wildlife survey was conducted at the site August – September, 2006. During this inventory no threatened or endangered wildlife species were identified. The species listed in Table 2 have been categorized based on the land cover types within the AUAR area.



**Table 2. Wildlife Survey**

| Species                    | Woodland/Forest | Lawn/Short Grass | Cropland | Herbaceous Wetland/Open Water | Shrubland | Grassland |
|----------------------------|-----------------|------------------|----------|-------------------------------|-----------|-----------|
| White-tailed Deer          | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Fox Squirrel               | ✓               | ✓                | ✓        | ✓                             |           |           |
| Pine Squirrel              | ✓               | ✓                |          |                               |           |           |
| Grey Squirrel              | ✓               | ✓                | ✓        |                               |           |           |
| Short-tail Shrew           |                 |                  |          | ✓                             |           | ✓         |
| Stripped Skunk             |                 | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Jack Rabbit                |                 |                  | ✓        | ✓                             | ✓         | ✓         |
| 13-lined ground squirrel   |                 | ✓                | ✓        |                               |           | ✓         |
| Franklin's Ground squirrel |                 |                  |          |                               |           | ✓         |
| Eastern Chipmunk           | ✓               |                  |          |                               | ✓         |           |
| Red Fox                    |                 |                  |          | ✓                             | ✓         | ✓         |
| Grey Fox                   | ✓               |                  |          |                               | ✓         |           |
| Cottontail Rabbit          | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| White-footed Mouse         |                 | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Deer Mouse                 | ✓               |                  |          |                               | ✓         |           |
| House Mouse                |                 |                  | ✓        |                               |           |           |
| Meadow Jumping Mouse       |                 |                  |          | ✓                             |           | ✓         |
| Western Harvest Mouse      |                 |                  |          |                               |           | ✓         |
| Raccoon                    | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Opossum                    | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Woodchuck                  |                 | ✓                | ✓        |                               |           |           |
| Mink                       |                 |                  |          | ✓                             |           |           |
| Muskrat                    |                 |                  |          | ✓                             |           |           |
| Beaver                     |                 |                  |          | ✓                             |           |           |
| Meadow Vole                |                 |                  |          | ✓                             |           | ✓         |
| Prairie Vole               |                 |                  |          |                               |           | ✓         |
| Least Weasel               |                 |                  |          | ✓                             | ✓         | ✓         |
| Coyote                     |                 |                  | ✓        | ✓                             | ✓         | ✓         |
| Plains Pocket Gopher       |                 | ✓                | ✓        |                               |           | ✓         |
| Short-tailed Weasel        | ✓               |                  | ✓        | ✓                             | ✓         | ✓         |
| Long-tailed Weasel         | ✓               |                  | ✓        | ✓                             | ✓         | ✓         |
| Least Shrew                | ✓               |                  |          | ✓                             |           | ✓         |
| Masked Shrew               | ✓               |                  |          |                               |           | ✓         |
| Short-tailed Shrew         | ✓               |                  |          |                               |           |           |
| Little Brown Myotis        | ✓               |                  |          |                               |           |           |
| Eastern Red Bat            | ✓               |                  |          |                               |           |           |
| Hoary Bat                  | ✓               |                  |          |                               |           |           |
| Silver-haired Bat          | ✓               |                  |          |                               |           |           |
| Eastern Pipistrelle        | ✓               |                  |          |                               |           |           |
| Big Brown Bat              | ✓               |                  |          |                               |           |           |
| Upland Sanpiper            |                 |                  |          |                               |           | ✓         |
| Gray Partidge              |                 |                  | ✓        |                               |           |           |
| Black-capped Chickadee     | ✓               |                  |          |                               |           |           |
| Turkey Vulture             | ✓               |                  |          |                               |           |           |
| Cooper's Hawk              | ✓               |                  |          |                               |           |           |
| Eastern Screech Owl        | ✓               |                  |          |                               |           |           |
| Barn Owl                   | ✓               |                  |          |                               |           | ✓         |

| Species                   | Woodland/Forest | Lawn/Short Grass | Cropland | Herbaceous Wetland/Open Water | Shrubland | Grassland |
|---------------------------|-----------------|------------------|----------|-------------------------------|-----------|-----------|
| Black-billed Cuckoo       | ✓               |                  |          |                               | ✓         |           |
| Red-bellied Woodpecker    | ✓               |                  |          |                               |           |           |
| Red-headed Woodpecker     |                 | ✓                |          |                               |           |           |
| Yellow-bellied Sapsucker  | ✓               |                  |          |                               |           |           |
| Whip-poor-will            | ✓               |                  |          |                               |           |           |
| Long-eared Owl            | ✓               |                  |          |                               |           |           |
| Ruby Throated Hummingbird | ✓               |                  |          |                               |           |           |
| Northern Cardinal         | ✓               |                  |          |                               | ✓         |           |
| Red-tailed Hawk           | ✓               | ✓                | ✓        | ✓                             | ✓         |           |
| Wild Turkey               | ✓               | ✓                | ✓        | ✓                             | ✓         |           |
| Great Horned Owl          | ✓               | ✓                | ✓        | ✓                             |           |           |
| Gray Catbird              |                 |                  |          |                               | ✓         |           |
| American Crow             | ✓               | ✓                | ✓        | ✓                             | ✓         |           |
| American Coot             |                 |                  |          | ✓                             |           |           |
| American Kestrel          |                 |                  | ✓        |                               |           |           |
| American Robin            | ✓               | ✓                |          |                               | ✓         |           |
| American Goldfinch        |                 | ✓                |          |                               |           |           |
| American Snipe            |                 |                  |          | ✓                             |           |           |
| Blue Jay                  | ✓               | ✓                |          |                               | ✓         |           |
| Common Grackle            |                 | ✓                | ✓        | ✓                             | ✓         |           |
| Common Pigeon             |                 | ✓                |          | ✓                             |           | ✓         |
| Downy Woodpecker          | ✓               |                  |          |                               |           |           |
| European Starling         |                 | ✓                |          |                               | ✓         |           |
| Hairy Woodpecker          | ✓               |                  |          |                               |           |           |
| House Sparrow             |                 | ✓                | ✓        | ✓                             | ✓         |           |
| House Wren                |                 |                  | ✓        |                               |           |           |
| Pileated Woodpecker       | ✓               |                  |          |                               |           |           |
| Purple Finch              |                 | ✓                |          |                               |           |           |
| Mourning Dove             |                 | ✓                | ✓        | ✓                             | ✓         |           |
| Northern Oriole           | ✓               | ✓                |          |                               |           |           |
| Northern Flicker          |                 | ✓                |          |                               |           |           |
| Northern Cardinal         |                 | ✓                |          |                               |           |           |
| Rose-breasted Grosbeak    | ✓               |                  |          |                               |           |           |
| American Redstart         | ✓               |                  |          |                               |           |           |
| American Bittern          |                 |                  |          | ✓                             |           |           |
| Virginia Rail             |                 |                  |          | ✓                             |           |           |
| Red-eyed Vireo            | ✓               |                  |          |                               |           |           |
| Trumpeter Swan            |                 |                  |          | ✓                             |           |           |
| Great Blue Heron          |                 |                  |          | ✓                             |           |           |
| Eastern Kingbird          |                 |                  |          |                               |           | ✓         |
| Upland Sandpiper          |                 |                  |          |                               |           | ✓         |
| Bluebills                 |                 |                  |          | ✓                             |           |           |
| Wood Thrush               | ✓               |                  |          |                               |           |           |
| Golden Crowned Kinglet    | ✓               |                  |          |                               |           |           |
| Loggerhead Shrike         |                 |                  |          |                               |           | ✓         |
| Purple Martin             | ✓               |                  | ✓        |                               |           |           |
| Eastern Meadowlark        |                 |                  |          |                               |           | ✓         |

| Species                 | Woodland/Forest | Lawn/Short Grass | Cropland | Herbaceous Wetland/Open Water | Shrubland | Grassland |
|-------------------------|-----------------|------------------|----------|-------------------------------|-----------|-----------|
| White Breasted Nuthatch | ✓               |                  |          |                               |           |           |
| Scarlet Tanager         | ✓               |                  |          |                               |           |           |
| Mallard                 |                 |                  | ✓        | ✓                             |           | ✓         |
| Wood Duck               | ✓               |                  | ✓        | ✓                             |           | ✓         |
| Brown-headed Cowbird    |                 |                  | ✓        |                               |           |           |
| Canada Goose            |                 |                  | ✓        | ✓                             |           |           |
| European Starling       |                 |                  | ✓        | ✓                             |           | ✓         |
| Snow Goose              |                 |                  | ✓        | ✓                             |           |           |
| Pintail                 |                 |                  | ✓        | ✓                             |           |           |
| Blue-Wing Teal          |                 |                  | ✓        | ✓                             |           |           |
| Green-Wing Teal         |                 |                  | ✓        | ✓                             |           | ✓         |
| Ringneck Pheasant       |                 |                  | ✓        | ✓                             | ✓         | ✓         |
| Common Pigeon           |                 |                  | ✓        | ✓                             |           |           |
| N. Harrier Marsh Hawk   |                 |                  |          | ✓                             |           | ✓         |
| Red-Winged Blackbird    |                 |                  | ✓        | ✓                             |           |           |
| Yellow-Headed Blackbird |                 |                  | ✓        |                               |           | ✓         |
| Killdeer                |                 |                  | ✓        |                               | ✓         | ✓         |
| Pie-billed Grebe        |                 |                  | ✓        |                               |           |           |
| Turkey Vulture          |                 |                  | ✓        | ✓                             |           | ✓         |
| Barn Owl                |                 |                  | ✓        |                               |           |           |
| Barn Swallow            |                 |                  | ✓        | ✓                             |           |           |
| Tree Swallow            |                 |                  |          | ✓                             |           |           |
| American Egret          |                 |                  | ✓        | ✓                             |           |           |
| Marsh Wren              |                 |                  | ✓        | ✓                             |           |           |
| Sedge Wren              |                 |                  |          | ✓                             |           |           |
| Blackduck               |                 |                  |          | ✓                             |           | ✓         |
| Canvasback              |                 |                  |          | ✓                             |           |           |
| Northern Shoveler       |                 |                  |          | ✓                             |           |           |
| Sora                    |                 |                  |          | ✓                             |           |           |
| Brown Thrasher          |                 |                  |          | ✓                             |           |           |
| Spring Beeper           |                 |                  |          | ✓                             |           | ✓         |
| Dickcissel              |                 |                  |          |                               |           |           |
| Northern Leopard Frog   | ✓               | ✓                |          | ✓                             |           | ✓         |
| Western Chorus Frog     |                 |                  |          |                               |           | ✓         |
| Grey Tree Frog          | ✓               | ✓                |          | ✓                             |           |           |
| Spring Beeper           | ✓               |                  |          | ✓                             |           |           |
| American Toad           | ✓               | ✓                |          | ✓                             |           | ✓         |
| Western Chorus Frog     | ✓               |                  |          | ✓                             |           |           |
| Tiger Salamander        | ✓               |                  |          |                               |           |           |
| Painted Turtle          |                 |                  |          | ✓                             |           |           |
| Common Garter Snake     | ✓               | ✓                | ✓        | ✓                             | ✓         | ✓         |
| Plains Garter Snake     |                 | ✓                | ✓        |                               |           | ✓         |
| Fox Snake               | ✓               | ✓                |          |                               |           |           |
| Redbelly Snake          | ✓               |                  |          |                               |           |           |
| Brown Snake             | ✓               | ✓                |          |                               |           |           |
| Green Snake             |                 |                  |          |                               |           | ✓         |
| Northern Leopard Frog   | ✓               | ✓                |          | ✓                             |           | ✓         |

The shading within the columns indicates the species was observed in the corresponding habitat type within the AUAR area. Observation criteria included, (but were not limited to), scat, tracks, feathers, hairs, skeletal remains, vegetative cuttings, scrapes, rubs, foraging sign, nests, beds, and/or dens.

## Ecologically Sensitive Resources

The Minnesota Department of Natural Resources does not list any special concern, threatened, or endangered species on or adjacent to the Project area.

However, all natural areas and wildlife species throughout the GEMISD AUAR area will be sensitive to changes in the current conditions. However, there are no threatened or endangered species, and no rare habitat types exist within the AUAR project area. Wetlands within the project area are afforded state protection by the Wetland Conservation Act, and federal protection through the Clean Water Act; if they are determined to be a Water of the U.S. Wetland impacts will be handled in accordance with the Wetland Conservation Act and Clean Water Act standards and requirements.

## Potential Wetland Area Evaluation

A wetland evaluation of the project site has been completed by I&S utilizing; aerial photograph review data, Blue Earth County soil survey data, National Wetland Inventory Maps, and field identification.

Aerial photograph review data was gathered and utilized in accordance with the State of Minnesota Interagency Cooperative Agreement for Implementation of the Federal Wetland Delineation Memorandum of Agreement (1994). The Minnesota Wetland Mapping Conventions for 1985 Food Security Act (FSA) as Amended and Section 404 Clean Water Act (CWA) section of the Memorandum of Agreement mentioned above, has been utilized to establish aerial photograph review guidelines and interpretation of that data.

**Table 3. Decision Matrix for Off-site Wetland Determinations**

| Hydric Soil Map Unit and Inclusions | National Wetland Inventory Map | ASCS Slides - Frequency of Occurrence of Wetland Signatures (Normal Precipitation Years) | Status                         |
|-------------------------------------|--------------------------------|--|--------------------------------|
| Yes or No                           | No                             | $\leq 30\%$  | Non-wetland or Prior Converted |
| Yes or No                           | No                             | 30% to 50%   | Field Verify                   |
| Yes or No                           | No                             | $\geq 50\%$  | Wetland                        |
| Yes or No                           | Yes                            | $\leq 30\%$  | Field Verify                   |
| Yes or No                           | Yes                            | 30% to 50%   | Wetland                        |
| Yes or No                           | Yes                            | $\geq 50\%$  | Wetland                        |

Source: State of Minnesota Interagency Cooperative Agreement for Implementation of the Federal Wetland Delineation Memorandum of Agreement, 1994, Page 5.

The Blue Earth County soil survey has been utilized in conjunction with the aerial photograph review data to reduce the potential error of identifying crop stress that may not be hydrology related. For example, hills can produce signatures on aerial

photographs that can be mistaken for water related crop stress signatures. The soil survey was also used to establish potential wetland areas within non-crop settings that could not be accessed by I&S.

The National Wetland Inventory (NWI) maps were used to assist in the identification of potential wetland areas in non-crop settings. According to the Minnesota Wetland Mapping Conventions the identification of a wetland basin within an agricultural field, on the NWI, also effects the interpretation of the aerial photograph review data. For example, if the NWI identifies a wetland basin in an agricultural field the percentage of normal years showing wetland signatures to identify an area as wetland is less than what is required for areas not indicated on the NWI.

Field identification of potential wetland areas by I&S was conducted during the walk through inventories conducted to identify land cover types and wildlife species present through the project site. Areas identified during the field inventories were not investigated with the detail of wetland delineation, so only obvious wetland basins have been identified through the field identification process.

The Potential Wetland Areas Map, located at the end of this report, is intended to be utilized as a planning and informational tool only, and the potential wetlands marked on this map do not constitute an official wetland delineation. Prior to any construction or development a wetland professional should be consulted as to the presence, absence, and/or delineated boundary of all wetlands within a given project area.

## CERTIFICATION

### Greater East Mankato Infill Service District (GEMISD) Mankato, Minnesota

#### Natural Resources Assessment Inventory Report

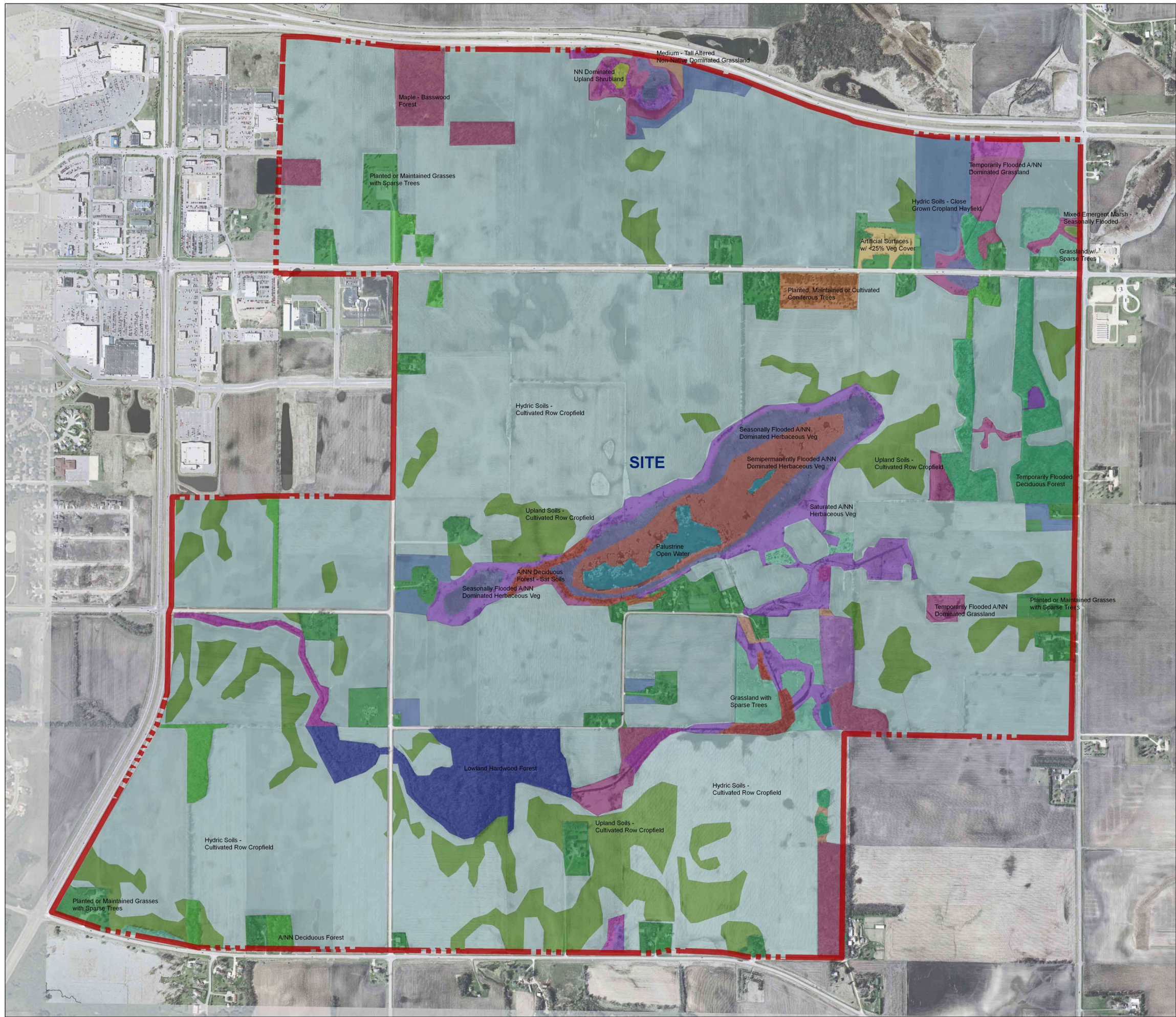
I hereby certify that the above-described evaluations, inventories, and report were prepared by me or under my direct supervision between August 1 and September 26, 2006.

A handwritten signature in cursive script that reads "Richard Davis". The signature is written in dark ink and is positioned above a horizontal line.

Richard Davis, Certified Associate Ecologist, Certified Arborist  
Natural Resources Biologist

Date: January 16, 2007





# COVER TYPE MAP

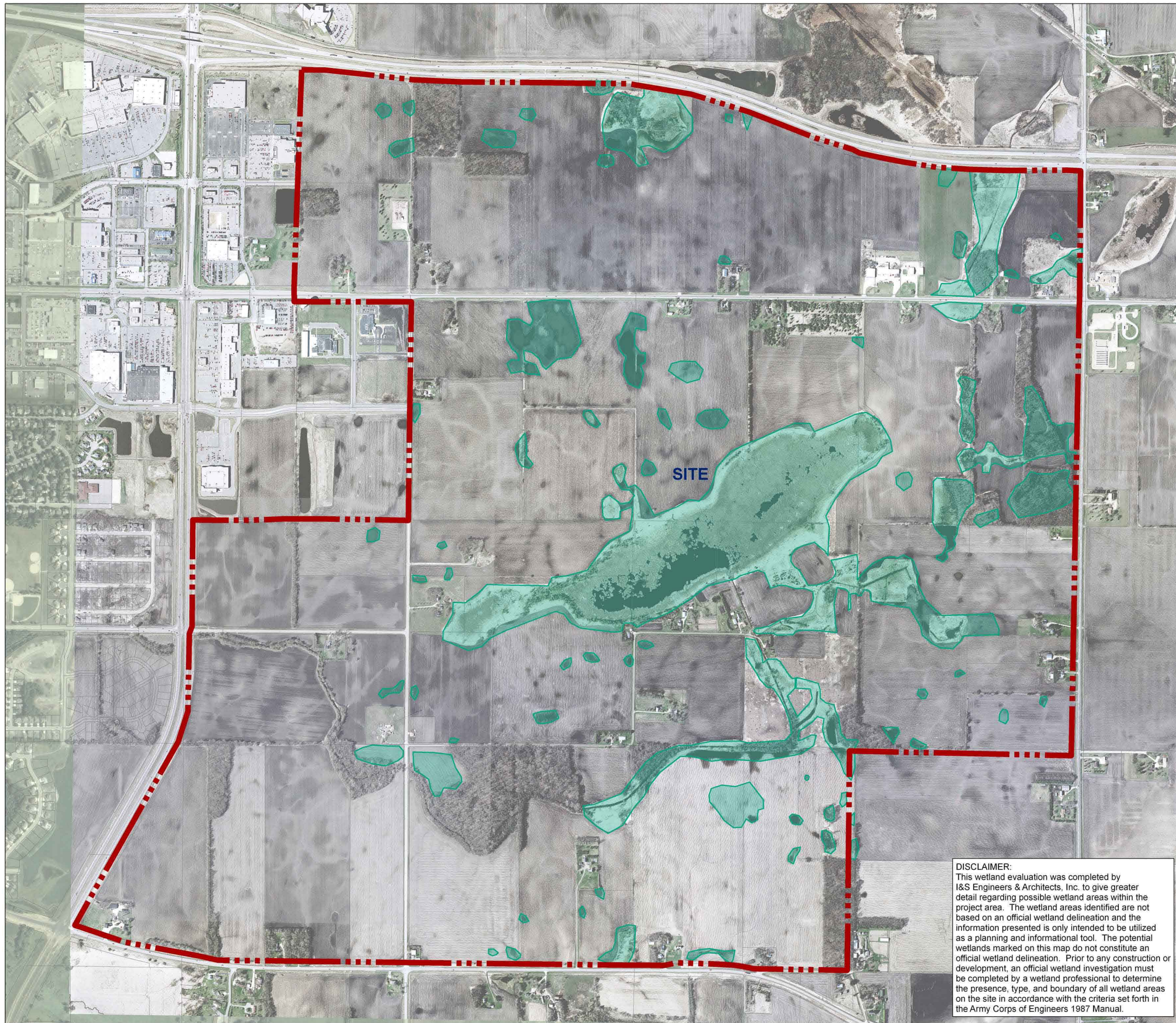
GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

LEGEND

- AUAR Boundary
- Hydric Soils - Close Grown Cropland Hayfield
- A/NN Deciduous Forest
- A/NN Deciduous Forest - Sat. Soil
- A/NN Temporarily Flooded Deciduous Forest
- Artificial Surfaces With Less than 25% Veg Cover
- Grassland with Sparse Trees
- Lowland Hardwood Forest
- Maple - Basswood Forest
- Medium-Tall Altered Non-Native Dominated Grassland
- Mixed Emergent Marsh - Seasonally Flooded
- NN Dominated Herbaceous Veg w/ Sparse Dec. Trees
- NN Dominated Upland Shrubland
- Palustrine Open Water
- Planted or Maintained Grasses with Sparse Trees
- Planted, Maintained or Cultivated Coniferous Trees
- Saturated A/NN Herbaceous Vegetation
- Seasonally Flooded A/NN Dominated Herbaceous Veg
- Semipermanently Flooded A/NN Herbaceous Veg
- Temporarily Flooded A/NN Dominated Grassland
- Temporarily Flooded Deciduous Forest
- Upland Soils - Cultivated Row Cropfield
- Hydric Soils - Cultivated Row Cropfield







# POTENTIAL WETLAND AREAS MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

**LEGEND**

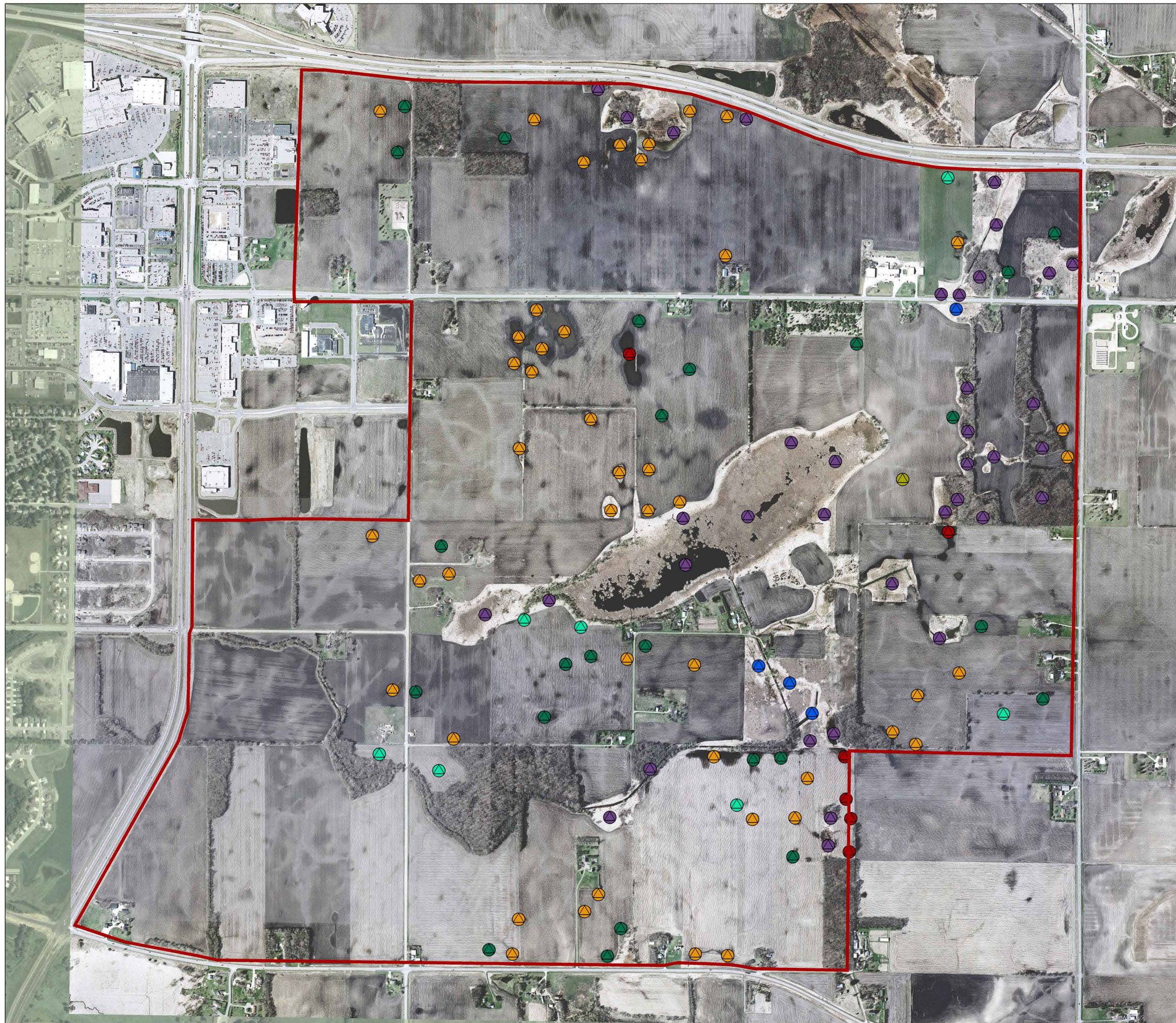
- AUAR Boundary
- Green Potential Wetland Areas



**DISCLAIMER:**  
This wetland evaluation was completed by I&S Engineers & Architects, Inc. to give greater detail regarding possible wetland areas within the project area. The wetland areas identified are not based on an official wetland delineation and the information presented is only intended to be utilized as a planning and informational tool. The potential wetlands marked on this map do not constitute an official wetland delineation. Prior to any construction or development, an official wetland investigation must be completed by a wetland professional to determine the presence, type, and boundary of all wetland areas on the site in accordance with the criteria set forth in the Army Corps of Engineers 1987 Manual.







# POTENTIAL WETLAND SIGNATURES

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA

LEGEND

— AUAR Boundary

**Wetland Features**

- Non-Agricultural Land NWI Indicator
- Non-Agricultural Land Field Identified or Aerial Photograph Identified
- Agricultural Land Less than 30% Aerial Occurrence with NWI
- Agricultural Land 30-50% Occurrence of Potential Wetland Hydrology
- Agricultural Land 30-50% Occurrence plus NWI Indicator
- Agricultural Land 50% or Greater Occurrence of Potential Wetland Hydrology
- Agricultural Land 50% or Greater Occurrence plus NWI Indicator



I&S Engineers & Architects, Inc.  
One firm - start to finish



**APPENDIX G.**  
**Planning Principles & Urban Design Alternatives**

# GREATER EAST MANKATO INFILL SERVICE DISTRICT

Mankato, Minnesota

## PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES



FEBRUARY 2007

*In Collaboration With:*



Project Number: 06-9293



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**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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## **INTRODUCTION**

Land use planning principles have been formulated and outlined for the Greater East Mankato Infill Service District project area. The purpose of these principles is to provide a greater definition of the intent for the project area and provides details expressing the character and quality of the area to be pursued during development. The focus of this report outlines a conceptual framework to guide future development of the project area. Key principles have been outlined in the following sections:

- Natural Resources Conservation and Enhancement
- Mixed Land Use & Gateway Nodes
- Connectivity & Multi-Modal Transportation
- Alternative Stormwater Management
- Regional Connectivity & Preservation
- Development Quality & Urban Design

These principles will provide a long-term vision and plan for the project area. The main goal of this document is to provide a tool that will have lasting value to staff and policy makers during ongoing discussions with land owners, developers and other stakeholders. These principles should be consulted in making policy decisions, when negotiating with developers and in locating primary infrastructure.

**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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**INITIAL GOALS**

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The development and proactive master planning of the Greater East Mankato Infill Service District offers the opportunity and challenge of creating a place that fosters a mixed-use, traditional neighborhood, village design with a focus on pedestrian-scale, greenspace preservation, and local identity. The initial goals of the City of Mankato in planning for the project area are listed below:

- Preserve and Enhance Open Space and Natural Resources as Amenities
  - Encourage higher land use densities to preserve and enhance open spaces.
  - Utilize open space, natural features and stormwater control areas as design elements of development.
  - Provide opportunities for large open spaces to be preserved and managed to create an amenity for development.
- Balance Land Use and Transportation
  - Create optimal traffic control and decreased impervious surface by following access management guidelines, shared parking, and traffic calming devices, to service development areas.
  - Provide nodes for multi-functional activity through both density-and neighborhood-based design to serve the local populations and support a 'point source' public transportation system. These nodes are proposed to be multi-modal and would also encourage pedestrian and bike connections through large right-of-ways used for boulevards, greenspace, stormwater control, and alternative transportation.
  - Create pedestrian and bike trails that are functional and recreational. The trails along roadways would be considered functional and efficiency-oriented, used for making trips from home to schools, commercial areas, recreation, or to other destinations.
  - Utilize unique traffic devices, such as roundabouts, narrow street widths, and other common traffic calming devices to address major intersections as a way to continue flow through the area in a safe manor for pedestrians.
- Utilize an Urban Village Concept with Cluster Development and Transit Influence
  - Encourage and support alternative development patterns which allow for a mixture of uses for retail, residential, and office to co-exist in the same areas, within nodes or urban villages.
  - Promote vertical orientation of development to enhance a diversity of land uses and encourage compact, walkable retail areas.
  - Create campus-like development patterns along highway areas to create connectivity, pedestrian-scale, and aesthetic views of the community entrances.
- Promote Diversity and Unity in Land Use and Design
  - Architectural diversity is generally encouraged throughout the project area and should be pursued through the use of varied building materials and architectural styles. It is also be important to encourage unity in design near the two major nodes.

**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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**KEY PRINCIPLES**

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The following section provides the key planning principles used to form the vision for the preferred land use scenario and the plans for the Greater East Mankato Infill Service District. These principles have been prepared as a tool for future development and should be used as a guide for future guidelines, recommendations, and development standards.

**NATURAL RESOURCE CONSERVATION AND ENHANCEMENT**

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The open greenspace area which includes the protected waters wetland located in the center of the project area, and the areas along Wilson Creek/County Ditch 12 supply a focal point for the project area and serves as a main preservation priority. This area will be further enhanced by trail additions and park development adjacent to the greenspace. The concept of a narrow, multi-modal parkway which loops around the large greenspace area, giving access to local streets, is intended to provide public views and direct experiences to this asset. Design and site layout of mixed-use, commercial and residential projects are expected to embrace and utilize all greenspace within the project area as an asset to development.

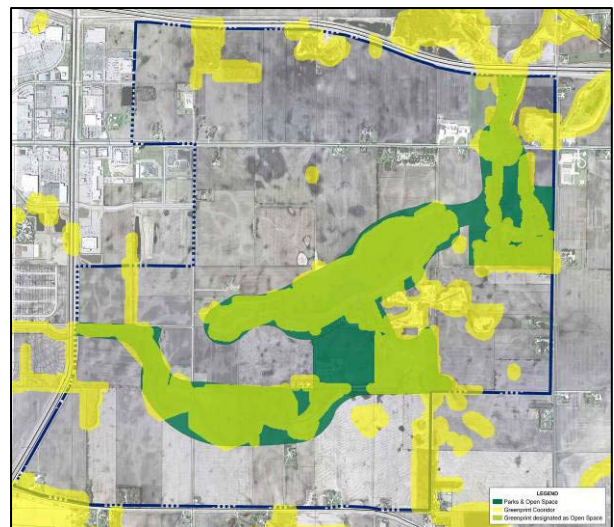
**Greenspace & Open Space Preservation**

The project area includes many significant natural features including a large wetland located in the center of the project area, Wilson Creek/County Ditch 12 extending south and west from the wetland to TH-22, and woodland areas located along Wilson Creek and in many other areas. These features combine to form an important greenway through the project area, which is expected to be preserved and enhanced.

Preservation of the community's natural resources can be accomplished using several different approaches, including developer park land dedication, City acquisition, and conservation or trail easement dedication.

The county is currently drafting a 'Greenprint Plan' which is a comprehensive plan for land within Blue Earth County. It is intended to bring natural resources to the forefront for planning and decision making. This plan is a smart-growth strategy that emphasizes land conservation to ensure quality of life, clean air and water, recreation, and economic health. Making the Greenprint vision a reality is a collective effort by local government, public and non-profit organizations, and individuals.

The areas mapped as open space is regarded as lands with substantial restrictions. These areas are high in natural resource or scenic value, and/or offer severe



Designated Park & Open Space & Blue Earth County Greenprint

## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

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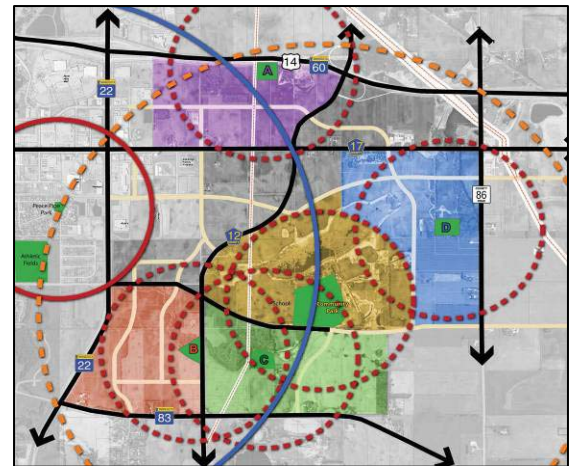
development limitations. The goal of these areas are to be primarily public lands. The picture to the right shows the designated park and open space in the project area and the amount of area mapped in Blue Earth County's Greenprint Plan.

#### Parks, Trails and Recreational Functions

The natural resources in the project area provide the primary identity for this area of the City of Mankato. A Parks and Open Space Plan has been developed specifically for the project area that addresses parks, trails, recreational functions, greenway corridors, and open space preservation.

#### Greenway Corridors

Establishing linear greenways can efficiently accommodate the collection, movement and/or infiltration of water, provide habitat corridors and movement connections, and is the best way to preserve unique resources. They can also establish linkages between City-owned parks, trails, open spaces, schools and other City amenities and provide diverse and unique recreational opportunities within the City.



Parks & Open Space Plan – Park Service Areas Map

By establishing greenspace areas and corridor connections in the land use plan, the benefits may include:

- Water quality
- Flood control and low flow augmentation
- Fish and wildlife habitat
- Education and recreational opportunities

#### Environmental Sustainability & Implementation

The City of Mankato continues to make a commitment to preserving sensitive areas within the community such as creek and river valleys, floodplains, wetlands, ravines, and unique bluff areas. It is important that these unique resources be preserved and protected as they provide many benefits to the community.

Giving citizens an opportunity to enjoy the natural resources will help them develop an awareness and appreciation of the environmental and recreation benefits these resources provide.

#### Low Impact Development

Developments within the project area should take an innovative, ecosystem-based approach to land development and stormwater management.

The primary goal of the LID approach is to provide ways to simultaneously incorporate economic and environmental considerations in to the land development process. This approach uses various land planning and design practices and technologies to

## **Greater East Mankato Infill Service District**

### **PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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simultaneously conserve and protect natural resource systems and reduce infrastructure costs. The basic LID principles that are incorporated into these design principles are: 1) Conserve natural areas, 2) minimize development impacts, 3) maintain site runoff rate, 4) Use integrated management practices, and 5) implement pollution prevention, proper maintenance, and public education programs. Some ideas for achieving these principles include: Reduce storm pipes and curb and gutter, preserve sensitive soils, cluster buildings and reduce building footprints, reduce road widths, minimize grading, limit lot disturbance, reduce impervious surfaces, maintain natural flow paths, use open drainage, use small-scale stormwater controls, use preventative, routine maintenance for stormwater facilities. Many of the principles of LID have already been included in the other sections of these planning principles.

#### **Goals**

The following list expresses the area's conservation and enhancement goals:

- The greenway should include wetlands, forested lands and the existing drainage ways. Preservation of these areas should occur based on environmental value, location as a viewshed, recreational opportunities adjacent to higher density and residential development, aesthetic importance and functional value (including stormwater treatment).
- Preservation of natural amenities should be coordinated with development of low impact trails and sidewalks in designated greenway and stormwater corridors, to permit recreational and observation activities as well as stormwater treatment.
- In order to better understand the impact of development over time, view corridors to open space from established development sites should be analyzed and mapped, based on location of major gateways and heavily traveled corridors.

#### **MIXED LAND USE & GATEWAY NODES**

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The preferred land use concept shows a variety of land uses, as well as outlines a series of corridors and multi-modal gateway nodes. Mixed land use includes apartments above retail areas, offices above retail, and live/work studios will be encouraged at key locations, including the two major central nodes. The two main central nodes (the intersections of CSAH 12 and Hoffman Road, and CSAH 12 and Bassett Drive) will reflect a formal and coordinated architecture with high-density mixed use. These areas will be the gathering places and will serve as 'gateways' from the surrounding neighborhoods. These gateway nodes should reflect a common scale and character that is typical of traditional neighborhood design.



Excelsior & Grand, St Louis Park, Minnesota



## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

#### Traditional Neighborhood Design

Traditional Neighborhood Designs integrate a variety of housing types, front porches, garageless streetscapes and street networks that invite pedestrians. As a result, the residents walk more and socialize informally in neighborhood squares and along the narrow streets.

Developments within the project area should have a design catered to comprehensive, mixed-use neighborhoods instead of isolated pods, subdivisions and developments.

#### Transitions

Appropriate physical transitions between diverse land uses are needed to ensure the successful evolution of land uses that vary by density and type.

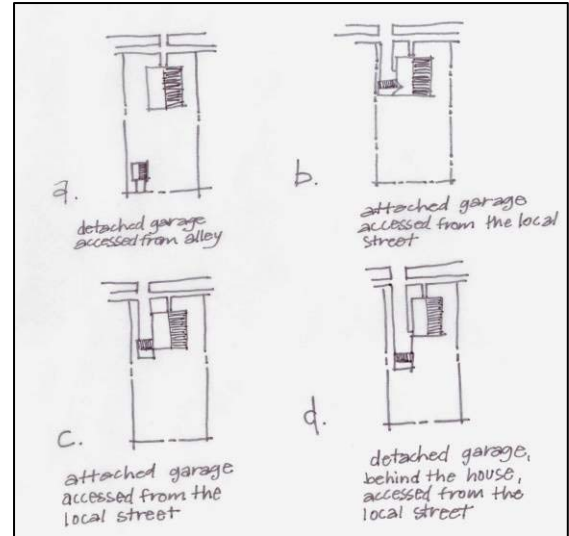
Developments within the project area should display a unified image and create ample pedestrian environments of walkways, courtyards, and other gathering places. Residential mixed use and other commercial buildings within the nodal areas are encouraged to stay within a three-story height range for pedestrian and environmental scale.

Office and industrial buildings can be mid-rise structures of no more than five stories in height and should be further limited in height where appropriate to be compatible with adjacent neighborhoods.

#### Gateway nodes

One of the primary nodes is intended to be located at Hoffman Road and CSAH 12, acting as a retail and residential destination typical of traditional neighborhood design, with higher-density housing than in any other locations in project area.

The second primary node occurs at Bassett Drive and CSAH 12 and is intended to bring significant identity to the project area as an entertainment and retail destination with the planned land use of a lifestyle center on the north side of the intersection.



Traditional Neighborhood Design – Single Family Residential Lot Design



Gateway Nodes -- Entertainment

#### Mixed Density and Use

The following land use designations are proposed for the project area:

## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

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#### Single Family Residential

Averaging four units per acre, this category would accommodate traditional conventional residential development.

#### Multi-Family Residential

Averaging twelve units per acre but no less than five units per acre, this category would generally accommodate two to six unit buildings as well as condominiums, and apartments.

#### Highway Commercial

Commercial and office development designed to address needs and convenience of the motorist. Pedestrian access and connections should be provided. No residential uses are allowed within this designation. This land use is situated along major arterial roads and can include a mix of auto- and neighborhood-oriented commercial uses.

#### Civic/Institutional

Public and private uses such as civic centers, clinics, hospitals, government facilities, churches and schools would be considered in this category.



Single Family Residential, Mason Run, Monroe, Michigan



Multi-Family Residential, Lake Oswego, Oregon



Mixed Residential/Retail, Pitchfork, Crested Butte, Colorado

#### Mixed Residential/Retail

This is the broadest mix of uses, including office, retail, and residential use, and include performance standards to ensure compatibility. Vertically mixed buildings are anticipated of 2 to 3 stories and includes areas in transition from commercial/industrial uses and residential areas.



Neighborhood Commercial, Boulder, Colorado

#### Neighborhood Commercial

This includes small- to moderate scale commercial uses serving primarily the adjacent neighborhood(s). May include specialty retail; community gathering businesses such as coffee shops or lower intensity entertainment; offices; studios or housing above retail (storefront retail with vertical mixed use). This use is typically situated in or adjacent to residential neighborhoods.



## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

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#### Lifestyle Center Commercial

A retail center or mixed-use commercial development generally arranged in open-air configuration that combines the traditional retail functions of a shopping mall with leisure amenities oriented towards upscale consumers. May serve as a destination point for leisure time, including eating establishments and entertainment. They are noted for design ambience and amenities such as fountains and street furniture conducive to casual browsing.

#### Office Industrial Campus

Areas for manufacturing, warehousing and distribution, production or processing; uses that have limited outdoor impacts such as noise, odor or storage, and can be located in relative proximity to non-industrial uses. This use would include office complexes, buildings and mixture of warehousing and office space. A site plan approach would include sharing of parking spaces, access lanes, amenities and stormwater treatment facilities as opposed to individual site design treatment.

#### Mixed Office Commercial

This use would exclude larger scale commercial uses. Most retail and commercial uses are allowed only in a vertical mixed use context. Smaller neighborhood based businesses would be mixed with office uses.

#### Office Tech Flex Space

This use accommodates office structures which may need prototype facilities or are in need of group technical support. Areas are intended for related activities that benefit from close proximity. Examples would include cellular companies, computer software or hardware, wireless enterprises, technology research and development, etc.

#### Industrial/Commercial

Accommodates the typical commercial and industrial uses. When zoning occurs, locations should be mapped so industrial users have convenient access to major transportation networks and benefit from visibility to/from these corridors. Examples would include: warehousing, manufacturing, production, distributing, sales lots, retail business, etc.



Lifestyle Center, South Town Square, Tulsa, Oklahoma



Mixed Land Use, Mankato, Minnesota

## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

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#### Goals

Key features include responsiveness to current-day market factors for development along TH 14, CR 22 and CR 83. However, new corridors and nodes, shown along CSAH 12 at Hoffman Road and Bassett Drive, would support commercial and multi family uses in addition to neighboring residential and office/ industrial activity.

The following goals support the evolution of land use patterns as outlined above:

- Horizontal (side by side within the same parcel) and vertical (ground floor and upper floors within the same parcel) land use mix is anticipated as the area develops, based on land economics, market demand factors and community acceptance.
- High density, mixed land use is anticipated along CSAH 12 from approximately Bassett Drive to Hoffman Road. High density housing is anticipated at twelve dwelling units per acre. Single family housing is planned at four dwelling units per acre.
- Retail commercial services should be located with immediate access to collector level or minor arterial streets. Likely locations are noted at the edges of the future developed area and within the node planned at Hoffman Road and CSAH 12.
- Site planning for parking lots should consider minimizing surface area, access points, interaction with trails and sidewalks, landscaping and screening depending on the nature of adjacent land uses.
- For node locations and all multi-family residential uses in the project area, parking is expected to be primarily built within structures of 2 stories or more. Some surface parking is anticipated for guest and deliveries but the majority of parking should occur within the building footprint (either at-grade, below-grade or elevated).

#### CONNECTIVITY & MULTI-MODAL TRANSPORTATION

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Ensuring the connectivity of the street, trail, parks and open space network is a major priority for the City of Mankato. Street networks as well as trail and sidewalk routes are defining features for development of this area.

Design and planning of the walking environment will receive significant attention, with a network of trails, paths and sidewalks on development sites expected to connect to area-wide facilities along major routes. This level of attention to pedestrian details will be equally important on surface parking lots as it will be in 'nodes' of mixed commercial and residential land uses. The functional classification, capacity, and physical character of the circulation system has been defined as an integral extension of the land use designations.



Roundabout, Ashville, North Carolina

## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

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#### **Pedestrians & Walkability**

A goal of the city is to make gateway nodes and neighborhoods as pedestrian-friendly and as bicycle-friendly as possible.

The easier it is for residents to walk or bike around their neighborhoods, the more likely they will allow themselves these forms of mobility. Streets within neighborhoods should be interconnected to form a network; this makes it possible to take a variety of routes to get to a particular destination and serves to lessen auto traffic on any one route. With less traffic on individual streets, people will be more inclined to use these street for biking.



Bike path as alternative transportation mode

Walkways and bike-paths should be integrated into the local neighborhoods and through the systems of public open space, parks, and playgrounds.

#### **Street System & Design**

Streets serve multiple purposes to enhance and add value to communities, as well as transportation purposes. Beyond their most basic function of allowing people to move about freely, they are also public spaces - streets need to get people to where they're going, but they should never damage a destination in the process. Streets should fit within a community's context, rather than forcing a community to build in a way that suits a street. Done correctly, a street may become a destination itself.

Along all streets, the sitting and orientation of buildings are encouraged to face the street in a strong, straightforward and welcoming manner. Street orientation of front doors, windows, and minimal building setbacks are suggested to create a pedestrian-friendly and active street environment. The design goals for this area regarding streetscape is to develop a place that allows for the recreational use of streets for walking, strolling, jogging, and bicycle riding. Streets are encouraged to be well-lit with down-lighting, shaded by trees, comfortable, and safe. All streets should support pedestrian activity.

Street systems should also incorporate innovative solutions for stormwater management that allow infiltration and limit stormwater runoff. Streets should features trees, landscaped swales, and other potential alternatives within the right of way and be



Traditional Narrow Street



## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

incorporated into the aesthetics of the boulevard

Development within this area should analyze the possibility of reducing standard street standard widths to create a more livable street design that accounts for all constituents of the road system, not just cars and emergency vehicles.

As an alternative to signalized intersections, roundabouts should also be considered for their substantial safety and traffic operation benefits. If roundabouts are used, they should be considered by designers during the initial design process of the CSAH 12 extension to develop some uniformity through the project area to enhance driver expectation, thereby enhancing public acceptability and safety.

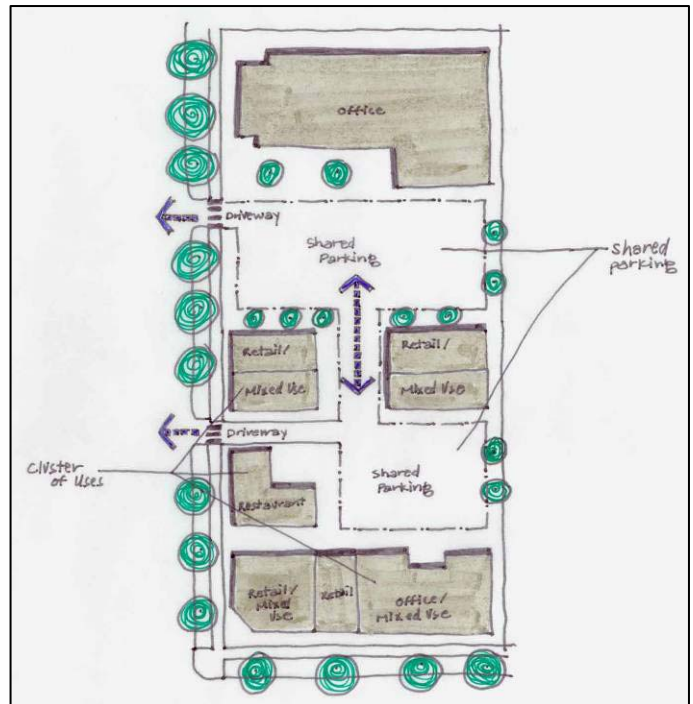
#### Transit Opportunities

Create mass transit systems, potentially through a Bus Rapid Transit (BRT) System, to link gateway nodes, neighborhoods, and employment centers. To optimize the efficiency of a mass transit system, intensified development should occur at and around system stops. Major destinations should be within a quarter-mile radius of the stop itself, and the design of the transition between stop and destinations should keep with pedestrian friendly design principles.

#### Parking (minimizing & shared alternatives)

Site planning for parking lots should consider minimizing surface area, access points, interaction with trails and sidewalks, landscaping and screening depending on the nature of adjacent land uses. Surface parking should also be oriented behind or to the side of a building when possible.

For node locations and all multi-family residential uses in the project area, parking is expected to be primarily built within structures of 2 stories or more. Some surface parking is anticipated for guest and deliveries but the majority of parking should occur within the building footprint (either at-grade, below-grade or elevated).



Compact Development with Shared Parking

On-street parking should also be considered to slow traffic and create better pedestrian environments by buffering sidewalks from moving vehicles and increase the viability of retail shops and services.

#### Goals

At a site level, these principles focus on ensuring positive, safe pedestrian experience and seamless transitions between differing land use types. The following connectivity and multi-modal transportation principles are illustrated in the Pilot Area sketches:

**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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- Priority routes for the trail system and sidewalks are described in the Trail and Sidewalk Plan. Connection to regional trails (Sakatah State Trail and South Route Trail, CSAH 90) as well as to the City of Eagle Lake is anticipated within reserved right of way or pipeline easements. This is further illustrated in Figure 2 of the Trail and Sidewalk Plan.
- Regional and community trails and sidewalks should be provided within the established right of way (assumed to be 120' for collectors and above) or when possible, dedicated easements for underground utilities (such as pipelines). These trails and sidewalks connect community-wide destinations (civic, commercial, residential and recreational) and serve area-wide needs for circulation and mobility. Local trails and nature trails may be implemented through a combination of dedication of private land and reservation of right of way for local streets.
- Transit service (potentially through a Bus Rapid Transit (BRT) System, is anticipated to increase along TH 22, Hoffman Road and CR 83 over the 30-year timeline for land use and development, based on trip generators such as higher density residential clusters and employment centers. Consequently, premium service for transit riders (frequent service, route transfers) will occur at designated nodes, such as Hoffman Road and CSAH 12. Transit node locations will be confirmed by the City of Mankato and participating transit service providers as population density increases and transit service expands in the project area. Therefore, design and site layout for parcels located adjacent to these transit nodes should produce a higher quality walkable environment and maximize visibility and orientation of entrances for both vehicular and transit passenger traffic.
- Pedestrian connections (sidewalks or paths) should be provided within each development site to reduce conflicts with automobiles, establish an attractive corridor for foot or bicycle traffic, and connect to other trails at designated pedestrian crossings.
- Landscaping and screening of dissimilar uses should make use of planting, fencing, or berms to deflect impacts such as noise, light or traffic.
- Access management recommendations for roadways at collector level and up should be developed to maximize shared access points and designate appropriate intersection locations to assist in orderly development process.

**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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**ALTERNATIVE STORMWATER MANAGEMENT**

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The City of Mankato has made a commitment to be a leader in reducing the impact of development on the natural environment. Innovative solutions have already been implemented at the wastewater treatment facility to significantly reduce the impact to the Minnesota River. Setting stormwater management as a high priority in this study area in the next logical step in reducing the impact of development.

Stormwater impacts can be divided into three major categories, all interrelated, but having differing methods of mitigation.

**Stormwater Rate Control**

As development occurs in the project area, the rate at which stormwater runoff leaves a site is increased. This increase leads most directly to adverse impacts to the downstream receiving water. In the case of the project area, if runoff rates are not controlled Wilson Creek may see an increase in bank and streambed erosion. In addition, flooding of downstream areas may become a concern.

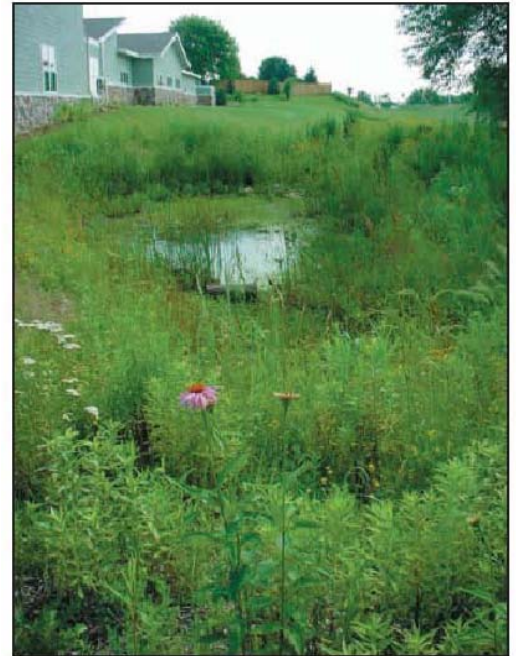


*Rain garden in a commercial development - Stillwater, MN*

less than the current rates. Preliminary calculations have been performed as part of the AUAR to provide guidance on these flow rates.

**Stormwater Volume Control**

The increase in impervious surfaces resulting from development of the study area will lead to an increase in runoff volume. As a result of the previously mentioned rate control, the duration of discharge from the study area will be extended. This scenario results



*Math & Science Academy - infiltration trench  
Woodbury, MN*

The City currently has rate control included in the stormwater ordinance. Developed areas must reduce the peak discharge rate from the site to meet the 2, 10, and 100 year storm events. Due to current erosion concerns in Wilson Creek, it is recommended that addition discharge requirements be placed on the study area to reduce the peak discharge rates to



*Residential rain barrel - Stillwater, MN*



## Greater East Mankato Infill Service District

### PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES

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in decreased groundwater discharge, increased downstream flow, and potential disruption to the channel.

To minimize this consequence, it is recommended that additional best management practices be employed to infiltrate, promote transpiration, or reuse stormwater runoff prior to discharge. City ordinances do not currently promote or require these alternative measures, so revised regulations would have to be implemented. These best management practices could be mandated by ordinance or promoted by a system of stormwater credits. Accepted methods of decreasing runoff volume include, but are not limited to:

- Bioretention
- Natural area conservation
- Rooftop disconnection
- Soil amendments
- Grass Channels
- Green roofs
- Stormwater Reuse



Celebration, Orlando, Florida

#### Stormwater Water Quality

The development of land from agricultural use to commercial, industrial, and residential use will change the quality of the surface water runoff. Common methods used for stormwater runoff rate and volume control can often be appropriately sized to provide significant water quality enhancement. Water quality should be considered throughout the design and review process for the stormwater management system on each site and from a system wide perspective. The Minnesota Pollution Control Agency has published an excellent resource titled 2005 Minnesota Stormwater Manual, which includes tools for assessing the expected water quality from various best management practices.



*H.B. Fuller - Vadnais Heights, MN*

This parking lot incorporates bioretention strategies to treat stormwater runoff. The landscaped depressions provide stormwater treatment, snow storage, and improved parking lot aesthetics and climate. Low maintenance sedges are used in place of traditional turf grass to lower maintenance costs and pollution.



**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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**Goals**

The following list expresses the area's stormwater management goals:

- Manage stormwater as close to source as possible by developing stormwater guidelines including a hierarchy of best management stormwater treatment practices to be included on a regional scale as well as provide options for each development project.
- Protect stream channels and reduce and/or prevent flooding within the project area and downstream through guidelines that address rate and volume control.
- Minimize increase runoff volume by engaging a stormwater program that promotes infiltration, capture/reuse, and vegetation systems that provide evaporation to return moisture to the atmosphere and groundwater resources.
- Promote increased water quality through guidelines for rate and volume level controls and establish water quality efforts that focus on local inputs and erosion control.
- Stormwater treatment within each development site should include more than one approved best management practice as defined by the City and other participating agencies.



Residential Rainwater Garden, Maple Grove, Minnesota

**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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**REGIONAL CONNECTIVITY & PRESERVATION**

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The project area has been receiving dual pressure being situation between the current city limits of Mankato and Eagle Lake. An underlying goal throughout the planning process has been to make sure this area was planned in consideration of the surrounding areas, specifically the city of Eagle Lake, surrounding rural areas, and other areas within the city of Mankato.

**Eagle Lake**

The city of Mankato has been working in collaboration with the city of Eagle Lake to address land use and growth issues. The city of Eagle Lake has expressed the desire to maintain a 'greenway strip' or 'agricultural strip' between the project area and Eagle Lake's urban growth boundary as defined by the Eagle Lake Land Use Plan Map. The goal of this physical separation is to help retain an identity and sense of place for the city rather than to become a 'suburb' of Mankato.

**Downtown Mankato, Hilltop**

A second underlying principle throughout the planning process has been the consideration of other areas of Mankato regarding commercial, office, industrial, and residential development. There are many other expanding areas and revitalization efforts continuously occurring simultaneously to development in the project area, which provides many opportunities for prospective developments and businesses. The process of planning in this area has taken a proactive approach to address potential environmental issues since this area has experienced continued development pressure.

**Agricultural & Rural Areas**

The City understands how important rural areas and agricultural practices are, not only to the character of the area, but to the vitality of our economy. The City is trying to take reasonable steps to ensure the rural and agricultural quality of life and to preserve agricultural land, open space and wildlife habitat while also trying to take a responsible approach to urban development. Blue Earth County also has controls to promote development where it can be sustained with public infrastructure services. This, in turn, protects the environment and deters fragmentation of agricultural areas by non-agricultural land uses.

**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

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**DEVELOPMENT QUALITY AND URBAN DESIGN**

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Architectural and landscaping treatments as well as building materials will reflect the level of investment committed to public infrastructure improvements. Quality building materials, studies of viewsheds to forested lands and wetlands and the use of native plant materials will foster a distinctive sense of place.

**Urban Design, Character, Streetscape, Boulevard, & Amenity Elements**

The City of Mankato's Urban Design Guidelines should be utilized and referenced for the project area wherever applicable, specifically in the area of Adams Street and Madison Avenue. However, it may be beneficial to establish guidelines, recommendations, development standards and illustrative prototypes that focus directly on the project area that address:

- Building appearance and placement
- Design character of gateway nodes
- Parking lot landscaping
- Setback and yard requirements
- Landscaping and signage
- Gateway enhancement
- Streetscape & Boulevard Design
- Amenity Elements
- Growth Management



Prospect, Colorado

The purpose of these guidelines would provide a potential developer with a graphic illustration of the standards and intent of the City for the project area.

**Goals**

The area's distinctive identity will be conveyed through the quality of built projects, the access patterns and site layout of those developments, as well as the character of public streets, trails/ sidewalks and preservation of open space features.

The following principles are intended to direct public and private investment in a coordinated, deliberate approach:

- Community destinations located on road corridors with higher volume traffic, in close proximity to the major wetland or other forestlands should be considered gateway locations. Design treatments for identified intersections and site development on adjacent parcels should recognize the visual and wayfinding importance of these locations. Entry signage or other orientation signage could be appropriate at the following locations:
  - Hoffman Road and CSAH 12
  - Hoffman Road and CR 86
  - Bassett Drive and CSAH 12
  - Bassett Drive and CR 86
  - TH 14 and CSAH 12

**Greater East Mankato Infill Service District**  
**PLANNING PRINCIPLES & URBAN DESIGN ALTERNATIVES**

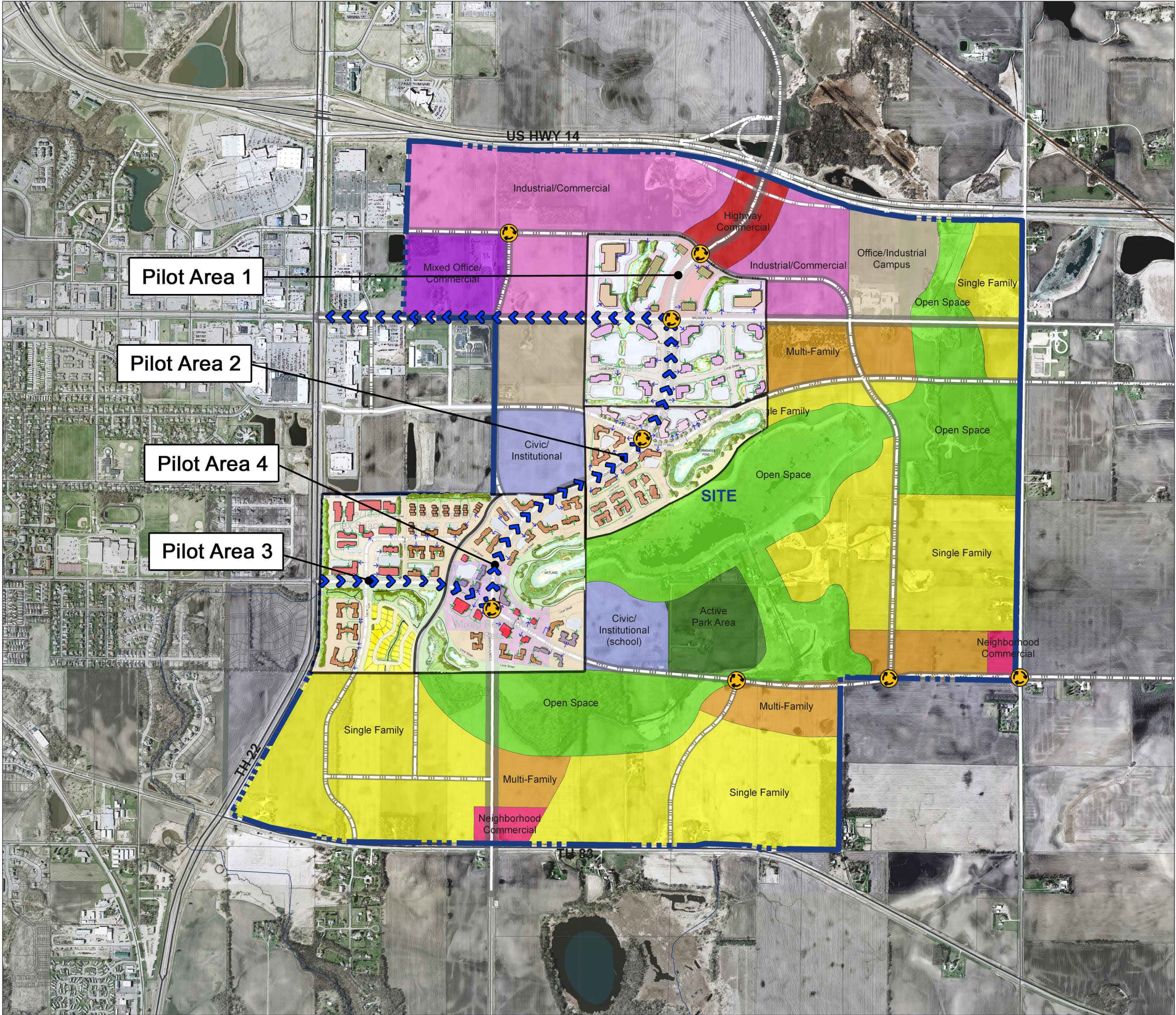
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- CR 83 and CSAH 12
- Street design on minor arterials and collectors should incorporate planted boulevards and medians.
- Street trees and lighting should be incorporated on minor arterials and collectors as a tool to further define identity and promote quality in the public right of way. Local streets may also benefit from including street trees and lighting depending on the specific development project.
- Viewsheds from destinations listed below to the major wetland and stormwater treatment facilities should be assessed so development approvals can be granted based on the ability to enhance views and the potential for recreational experience of the area's distinct natural features.
  - Justice Center at Bassett Drive and 586th Street
  - Lifestyle Commercial Center at Bassett Drive and CSAH 12
  - Gateway nodes at Hoffman Road/CSAH 12 and Bassett Drive/CSAH 12
  - School and Community Park site north of Hoffman Road
  - Hoffman Road corridor from TH-22 east along Wilson Creek/CD-12



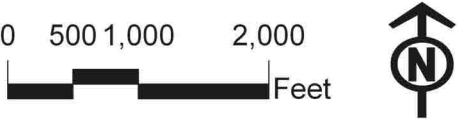
# PILOT AREA STUDIES KEY MAP

GREATER EAST MANKATO  
INFILL SERVICE DISTRICT  
MANKATO, MINNESOTA



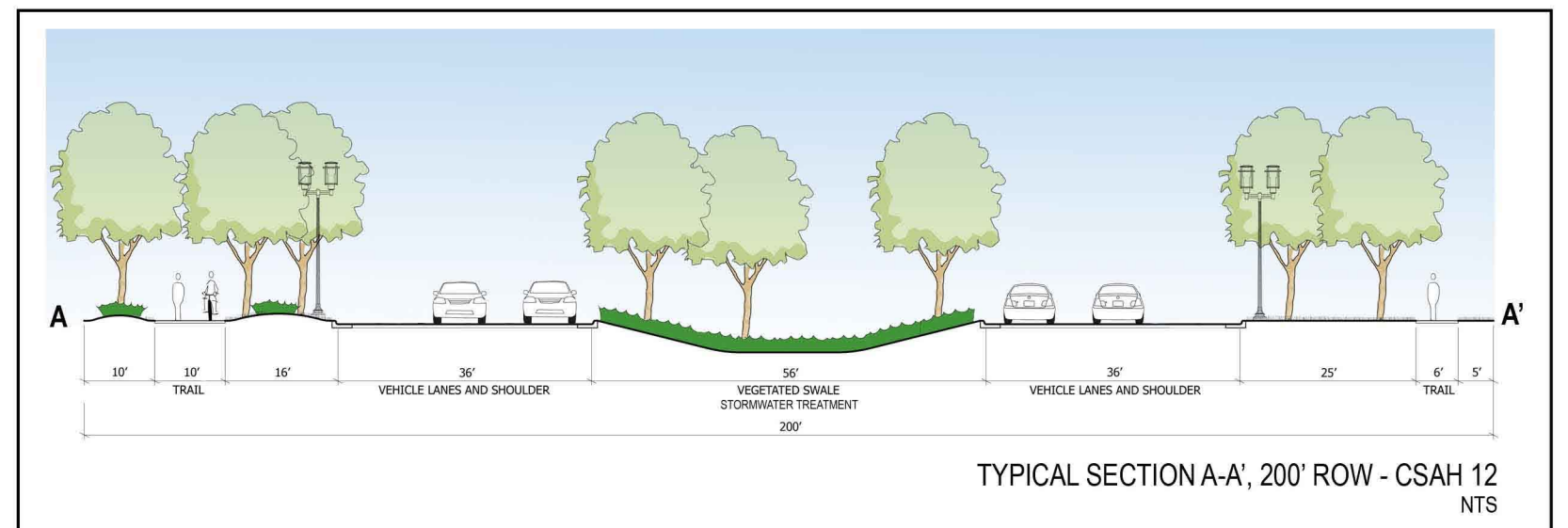
**LEGEND**

- AUAR Boundary
- Proposed Road & Right-Of-Way
- Proposed Roundabout
- Scenario C Land Use**
- Single Family Residential
- Multi-Family Residential
- Highway Commercial
- Neighborhood Commercial
- Mixed Residential/Retail
- Industrial Commercial
- Lifestyle Center Commercial
- Mixed Office Commercial
- Office/Industrial Campus
- Office/Tech Flex Space
- Civic/Institutional/School
- Open Space
- Active Park & Recreation Area
- Future Primary Transit Route



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One firm - start to finish





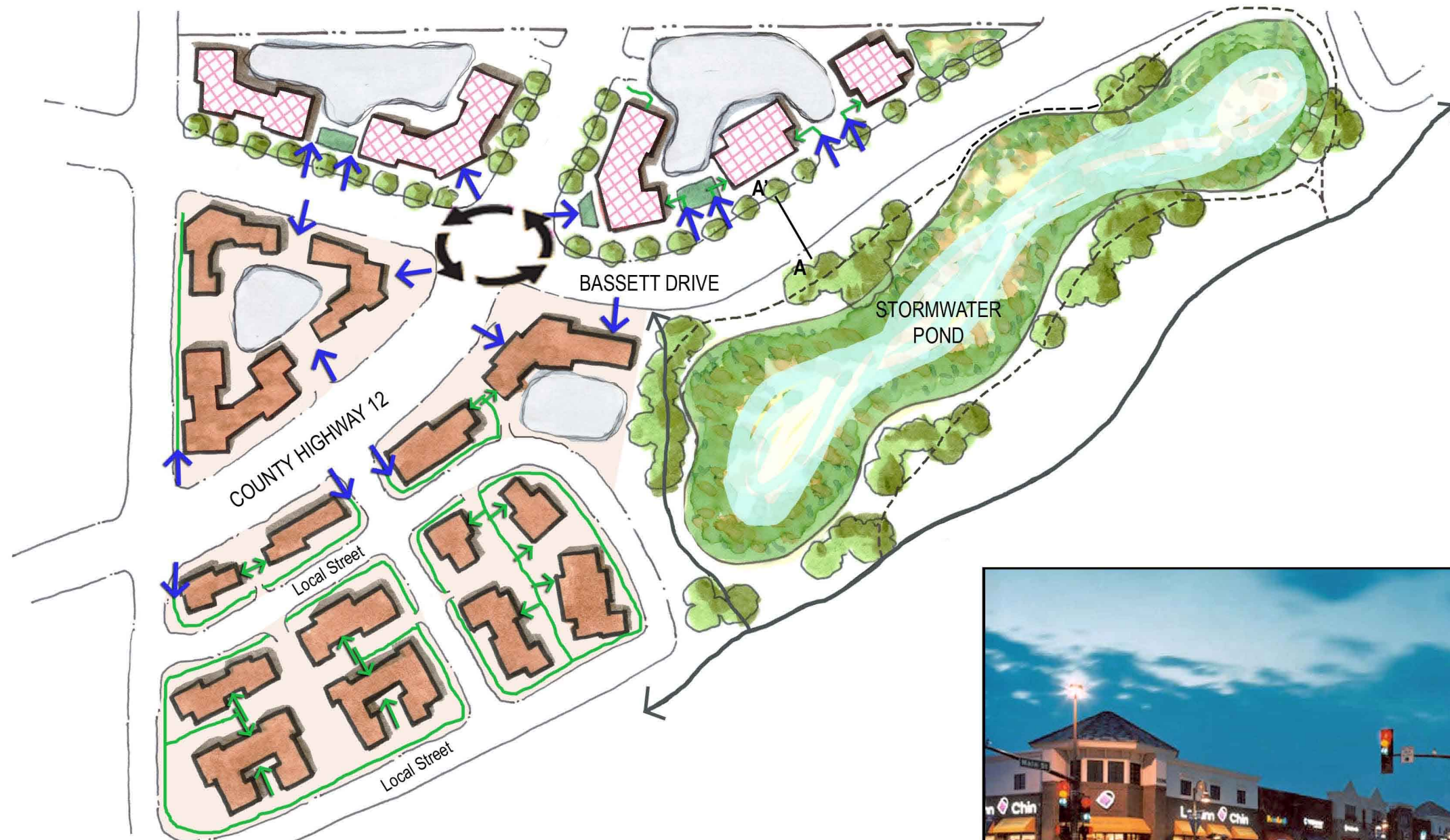
OFFICE/INDUSTRIAL CAMPUS

**LEGEND**

- Highway Commercial
- Office/Industrial Campus
- Industrial Commercial
- Parking Lot
- Regional Trail
- Nature Trail
- Trees
- Stormwater Treatment
- Pedestrian Connections
- Pedestrian Connections to Public Sidewalk

0 100 200 400

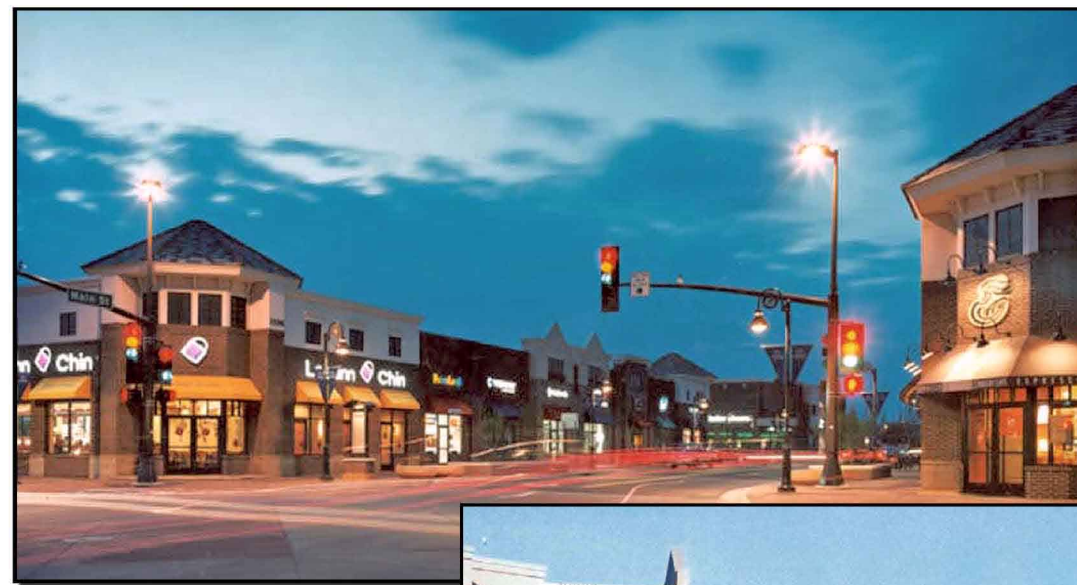




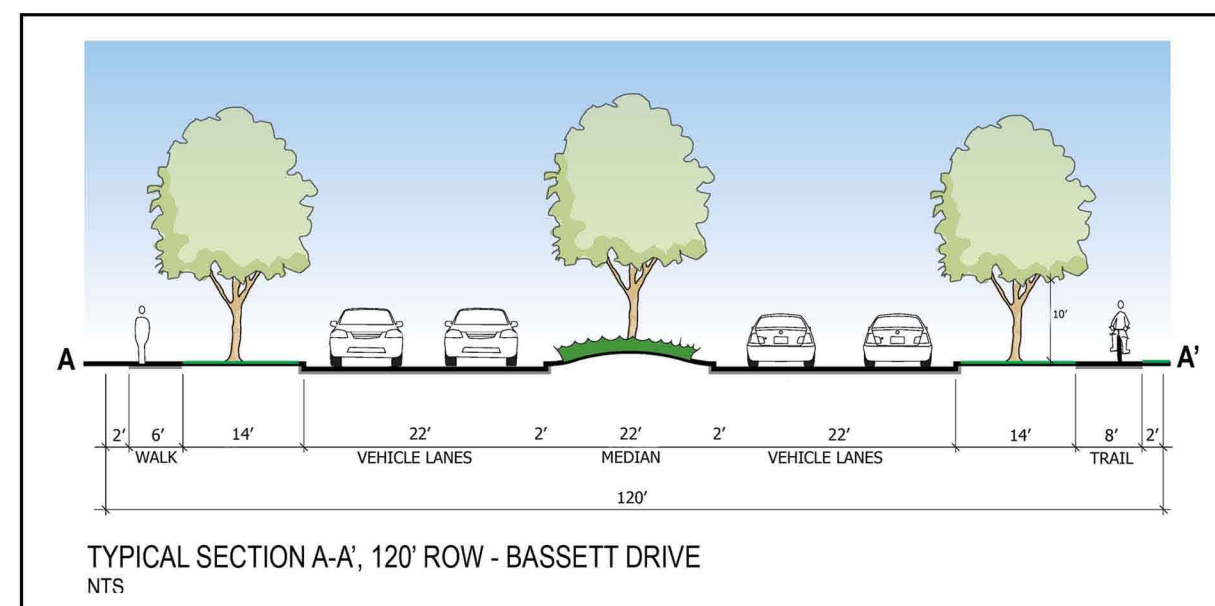
**LEGEND**

- Lifestyle Center Commercial
- Multi-Family Housing
- Parking Lot
- Regional Trail
- Nature Trail
- Trees
- Stormwater Treatment
- Pedestrian Connections
- Pedestrian Connections to Public Sidewalk

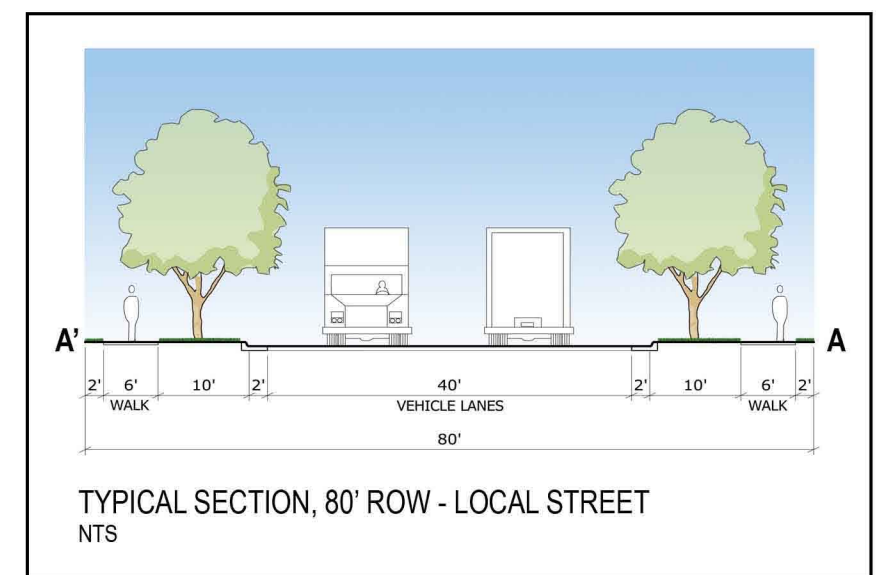
Scale: 0 100 200 400 feet



LIFESTYLE CENTER COMMERCIAL



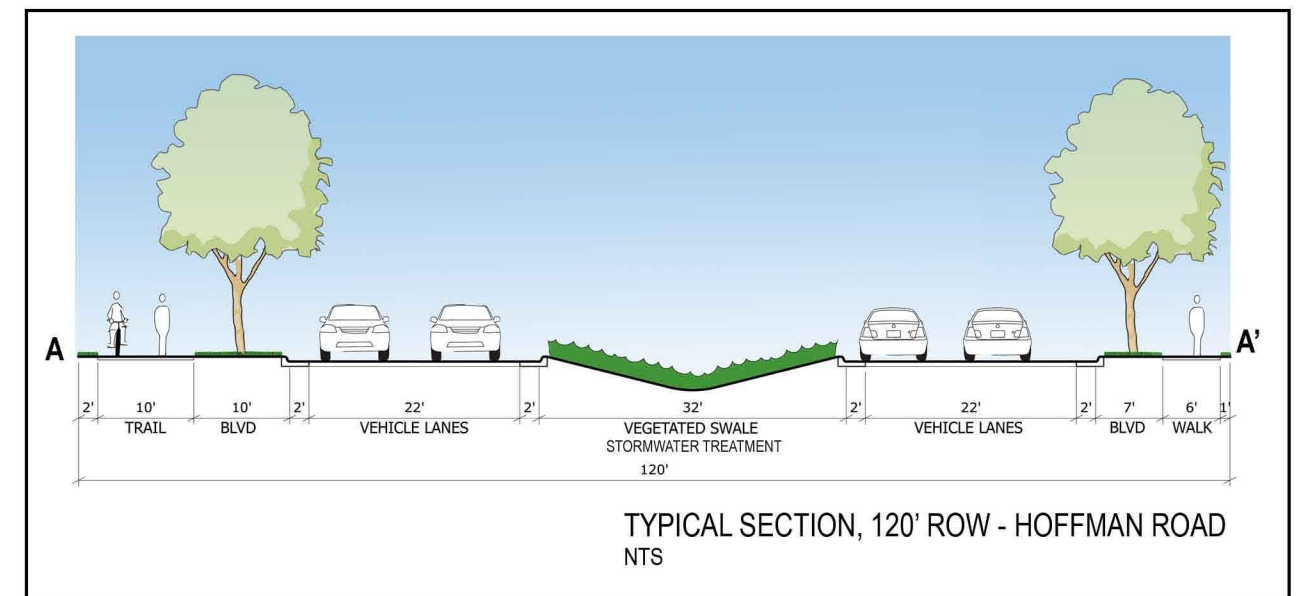




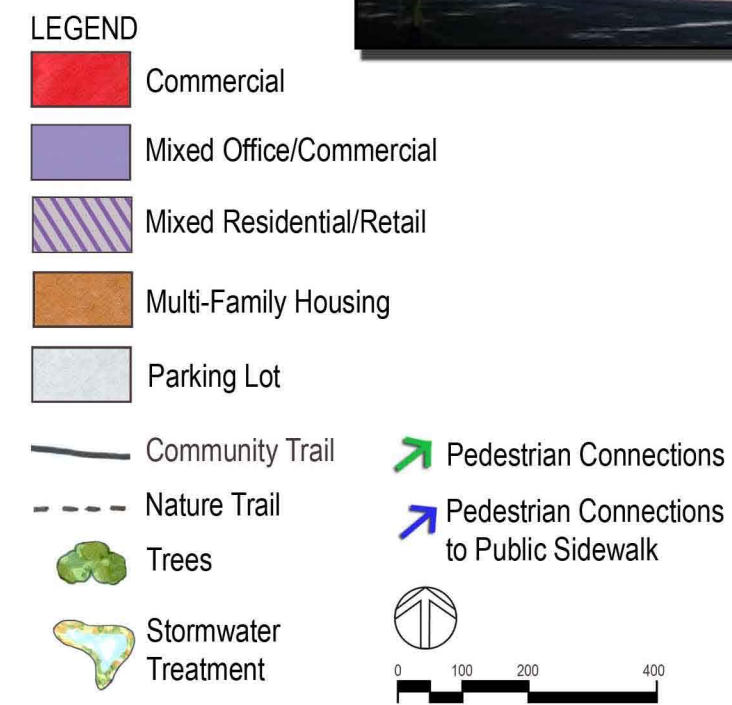
OFFICE/TECH FLEX SPACE



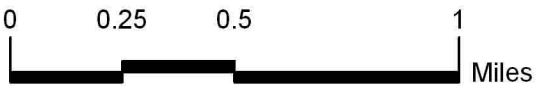
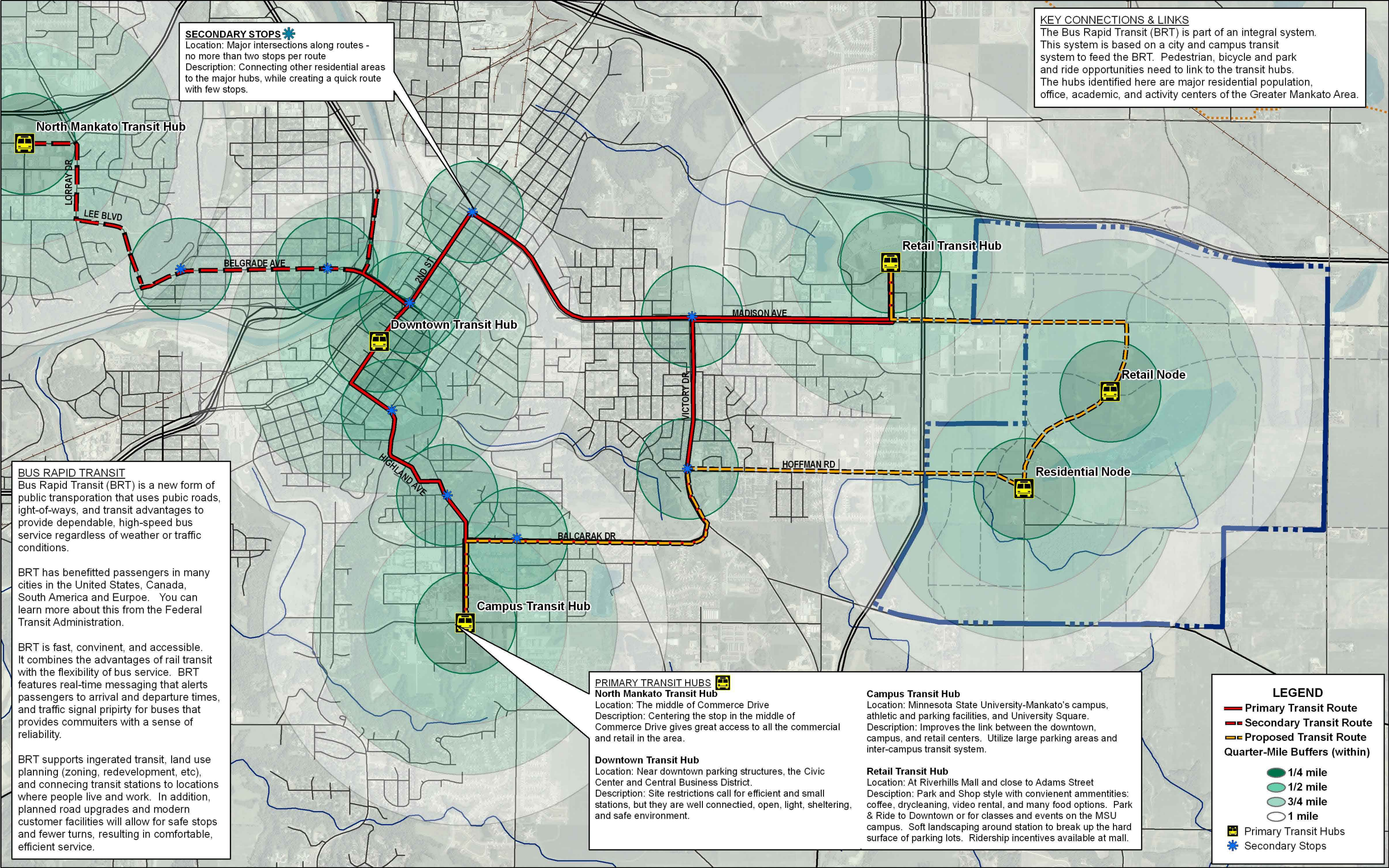




URBAN SERVICE NODE







# BUS RAPID TRANSIT ROUTES: TOTAL STREET CIRCUIT

Source: Paulsen Architects



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**APPENDIX H.**  
**Parks & Open Space Plan**

# GREATER EAST MANKATO INFILL SERVICE DISTRICT

Mankato, Minnesota

## PARKS & OPEN SPACE PLAN



FEBRUARY 2007

*In Collaboration With:*



Project Number: 06-9293



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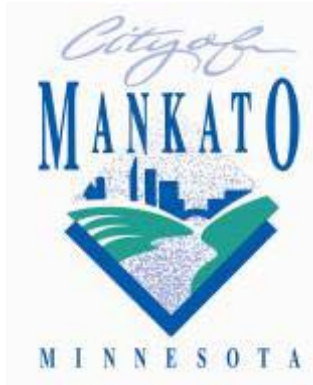


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**Greater East Mankato Infill Service District**  
**PARKS AND OPEN SPACE PLAN**

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**INTRODUCTION**

This report has been prepared to address the park and recreational needs of the Greater East Mankato Infill Service District (project area). This report also addresses the open space preservation efforts and greenway connections throughout the project area. This report has been divided into three sections, Neighborhood & Community Parks, Open Space, and Trails.

## **Greater East Mankato Infill Service District**

### **PARKS AND OPEN SPACE PLAN**

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#### **NEIGHBORHOOD & COMMUNITY PARKS**

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The City of Mankato has determined a goal of having all residential areas within walking distance (approximately 0.5 miles) of a neighborhood park and within 1.5 miles of a community park. This plan proposes four neighborhood parks and a community park (See Figure 1 – Park Service Areas). The plan also includes a greenway that will preserve a significant existing wetland, a forested drainage way and small forested areas. The provision of parks and open spaces within the project area will make the location attractive for new development and provide desired open space amenities for area residents, workers and visitors.

#### **NEIGHBORHOOD PARKS**

---

##### **Site Location Criteria**

Consistent with the City of Mankato's Park and Open Space Plan, new neighborhood parks within the project area are proposed to be 5-10 acres in size. Neighborhood Park A, located adjacent to a wet depression, is currently zoned for office industrial uses. This park will be primarily passive in nature. Neighborhood Parks B, C and D are shown to abut the proposed greenway, which will allow direct trail access between the parks and the greenway and visually link the parks to natural areas. These three parks are located adjacent to residential land uses that will promote safe walking and biking to the parks.

##### **Service Area**

The proposed neighborhood parks are located to best balance neighborhood park coverage of the project area and accomplish the goal of 0.5 mile radius service areas without crossing high volume arterial roadways.

##### **Park Facilities**

Neighborhood parks can be either active and/or passive regarding recreational opportunities, and may also provide facilities for all ages and to the extent possible and accommodations for diverse cultural populations.

##### Neighborhood Park A

Neighborhood Park A will be primarily passive in nature, providing scenic views, along with picnic and walking facilities for area workers during their lunch break. To accomplish this goal, the park should include:

- Picnic tables
- Open picnic shelter for shade
- Paved trails
- Benches
- Satellite toilet enclosure
- Trash receptacle
- Park signage

## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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- Supplemental trees, shrubs and perennial plantings to provide shade, screening, enclosure and visual interest
- Direct street frontage to enhance park legibility and safety
- On-street parking if no parking lot is provided within the park

If use is high or if park users express a desire for active recreation in this park, the City may want to include a basketball court (full or half), tennis courts or a fitness trail. Alternatively, if the City is in need of additional practice fields for youth sports or adult league sports fields, it may be appropriate to include sports fields in this park. Lighted fields will not likely have adverse impacts on the adjacent non-residential land uses.

#### NEIGHBORHOOD PARKS B, C AND D

Neighborhood Parks B, C and D should provide both active and passive recreational opportunities, including the following baseline amenities:

- Active
  - Play equipment for both the 2 – 5 year and the 5 – 12 year age groups.
  - A two (2) acre open field that can be used for unstructured play and for youth sport leagues as needed. It is not anticipated that these fields will be lit, as field lighting could have an adverse impact on adjacent residential land uses.
- Passive
  - Picnic tables
  - Open picnic shelter for shade
  - Paved trails
  - Benches
- Support
  - Satellite toilet enclosure
  - Trash receptacle
  - Park signage
  - Direct street frontage to enhance park legibility and safety
  - Supplemental trees, shrubs and perennial plantings to provide shade, screening, enclosure and visual interest
  - On-street parking if no parking lot is provided within the park

Dependent on neighborhood desires, system needs and available funding, baseline features should be supplemented with one or more of the following amenities:

- Active
  - Basketball court (full or half)
  - Tennis courts
  - Softball field
  - Soccer field
  - Fitness trail for adults
  - Outdoor skating and/or hockey rinks (with seasonal warming house or located adjacent to community building)



## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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- Passive
  - Community building with activity rooms and restrooms
- Support
  - Drinking fountains
  - Off-street parking for 10 – 20 vehicles, which may be necessary if the field is used for youth sport leagues

#### **Evaluation of Proposed Neighborhood Parks**

In 2002, the City was providing approximately 2.1 acres of neighborhood parks per 1,000 citizens. This was determined based on the City's 2002 Park and Open Space Plan, which indicated a total of 69.8 acres of existing neighborhood parks and the Minnesota State Demographer's 2002 population projection of 33,362. It is assumed that future City development will provide a comparable ratio of neighborhood parks to population. The following population projections are based on 2.31 people per housing unit.

#### Neighborhood Park A

Neighborhood Park A is a unique park within the system because there are no residential land uses proposed within the 0.5 mile service area of this park. Unless the City decides to provide some youth practice or adult recreation fields in this park, and assuming this park will primarily serve area workers, it may not need to meet the typical minimum acreage requirement of five acres.

#### Neighborhood Park B

Due to Neighborhood Park B's close proximity to two arterial roadways (Highway 22 and Highway 12), the park's functional service area is approximately ½ the size of a standard neighborhood park 0.5 mile radius service area (see Figure 1). Given the high proportion of residential land uses in the service area, the projected population for this area is approximately 2,700, which supports a five and one-half acre park, as determined by the 2.1 acres/1,000 population ratio.

The proposed park site is relatively level and open, providing views towards the adjacent wooded drainage way. It is located adjacent to single-family housing. Access to the park is proposed to be from a future local street.

#### Neighborhood Park C

The projected population of approximately 3,600 within the functional service area of this park will be large enough to support a seven and one half-acre neighborhood park using the 2.1 acres/1,000 population ratio. The proposed park site gently slopes towards the drainage way with views towards woodlands and the drainage way. It is located adjacent to multi-family housing and access to the park is proposed to be from a future local street.

## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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#### Neighborhood Park D

The projected population of approximately 3,300 within the 0.5 mile service radius of this park will be large enough to support a seven-acre neighborhood park using the 2.1 acres/1,000 population ratio. The proposed park site is relatively level and should incorporate both woodlands and open areas. It is located adjacent to single-family housing and access to the park is proposed to be from a future local street.

#### COMMUNITY PARKS

---

##### **Site Location Criteria**

The proposed community park within the project area is approximately 41 acres in size, which falls within the City's recommended community park acreage range of 20 – 50 acres. The site is relatively open and level. While the park does not directly encompass natural resources, two sides of the park lie directly adjacent to the proposed greenway. The trail network associated with the greenway will allow community residents to access the park by walking or biking, or by car. Park access is anticipated to be off Hoffman Road, a future transit route, thereby promoting alternative modes of transportation.

A new school is proposed directly on the west side of the park. Locating the park and school adjacent to each other will provide efficiencies by allowing the school and park to share facilities such as parking, sports fields and play equipment.

It is assumed that this community park will function as the neighborhood park for residents located within approximately 0.5 mile of the park.

##### **Service Area**

The community park is located in an area which will meet the goal of servicing two to three neighborhoods within a 1.5 mile radius service area.

##### **Park Facilities**

The community park should provide both active and passive recreational opportunities, facilities for all ages and to the extent possible, accommodations for diverse cultural populations. The City desires additional opportunities for the development of soccer and baseball fields within the City, which could be incorporated into a new community park. Additional amenities that should be incorporated into the park include:

- Active
  - Play equipment for both the 2 – 5 year and the 5 – 12 year age groups
  - Soccer fields (4)
  - Baseball fields (4)
  - A two-acre open field that can be used for unstructured play and for youth sport leagues as needed
- Passive
  - Picnic tables and grills
  - Park shelters to accommodate both large and small groups

## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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- Paved trail system
  - Support
    - Community building with activity rooms, storage and restrooms
    - Trash receptacles
    - Park signage
    - Parking lot(s)
- Benches
- Supplemental trees, shrubs and perennial plantings to provide shade, screening, enclosure and visual interest
- Drinking fountains

Dependent on system needs, available space within the park and available funding, the above amenities could be supplemented with one or more of the following features:

- Active
  - Sand volleyball courts
  - Skateboard park
  - Basketball courts (full or half)
  - Tennis courts
  - Fitness trail for adults
  - Small performance pavilion
  - Outdoor skating and/or hockey rinks (with season warming house or located adjacent to community building)
- Passive
  - Public art

#### **Evaluation of Proposed Neighborhood Parks**

According to City park standards, community parks should provide five to eight acres per 1,000 residents. Currently, the proposed community park appears to be undersized by approximately 28 acres, based on five acres per 1,000 residents and an estimated 13,800 new residents in the project area. In addition, if the City chooses to include a complex of four baseball fields, overlaid with four soccer fields, approximately 80 percent of the community park will be dedicated to the athletic fields and associated parking.

The smaller size of the park may not be a significant issue given the proximity of the elementary school and the greenway system. Parking demands for the school and the park will peak at different times during the day, allowing for shared parking between these facilities. In addition, strategic placement of ball fields, open play space and play equipment may allow these features to be shared between the school and the park. The adjacent greenway system could provide access to natural resources and passive recreation activities. If this approach is pursued, the implementation approach for the greenway will be critical for the successful integration of adjacent natural areas with the community park.

Alternatively, the City may want to consider formally incorporating approximately 28 acres of the adjacent greenway system into the community park. This may include the drainage way and associated forested land immediately east of the park. This

## **Greater East Mankato Infill Service District**

### **PARKS AND OPEN SPACE PLAN**

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approach would further assist in the protection of valued natural resources while also providing physical access to varied landscapes and plant communities.

The community park is essentially buffered on three sides by the greenway and the elementary school site will buffer the fourth side of the park, thereby enabling lighting on athletic fields, with minimal impacts on surrounding residential areas. The lighting may have some impacts on the adjacent wildlife habitat.

The City has expressed a desire for a community center within the park. If a community center is located within the park, it should be sited to take advantage of views toward the greenway system.



## **Greater East Mankato Infill Service District**

### **PARKS AND OPEN SPACE PLAN**

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#### **OPEN SPACE**

---

The City of Mankato has made a commitment to preserve sensitive areas within the community such as creek and river valleys, floodplains, wetlands, ravines, and unique bluff areas. It is important that these unique resources be preserved and protected as they provide many benefits to the community, such as:

- Wildlife habitat and movement corridors
- Reduced environmental impacts on sensitive areas
- Stormwater detention and treatment, groundwater aquifer recharge
- Visual relief and aesthetic enhancement of the community
- Buffers between adjacent land uses
- Opportunities for citizen exposure to its natural resources
- Environmental education opportunities for the community

Giving citizens an opportunity to enjoy the natural resources will help them develop an awareness and appreciation of the environmental and recreation benefits these resources provide.

Establishing linear greenways can efficiently accommodate the collection, movement and/or infiltration of water, and is the best way to preserve the unique resources. Linear greenways also provide important wildlife habitats and movement corridors. They can also establish linkages between City-owned parks, trails, open spaces, schools and other City amenities and provide diverse and unique recreational opportunities within the City.

#### **GREENWAYS**

---

The project area is rich in natural resources, including a significant wetland, a defined, wooded drainage way extending east from Highway 22 to the wetland, and small woodlands extending east and north of the wetland. It is this greenway that will provide the primary identity and image of this new area of the City. Two of the neighborhood parks, the community park and the proposed school site will directly abut the greenway in the project area. This will provide the opportunity for the greenway to support environmental education opportunities, allow wildlife viewing and incorporate a trail system to facilitate bicycling, in-line skating and walking to community destinations. The preservation of this greenway should be a high priority for the City.

A large portion of the project area drains to the central wetland. As development occurs, an opportunity exists to integrate stormwater treatment areas into the new development areas that will provide linkages to the greenway. Within residential neighborhoods, an opportunity also exists to incorporate local trails adjacent to the stormwater treatment areas that could directly connect to the greenway.

## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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In the northern section of the project area, where there is a higher proportion of high volume roadways, constructed stormwater treatment areas will provide linkages to the greenway. Trails can be developed adjacent to the stormwater treatment areas to provide on-site circulation. While it is desirable to create a combined trail/stormwater treatment system that links to the greenway, it may be difficult to implement because numerous functional and safety requirements must be balanced. These requirements include site access locations, site layout and circulation, and safe pedestrian crossings across high volume roadways, such as Madison Avenue, Bassett Drive, Hoffman Road, County Highway 12 and Adams Street.

This area of the City has most recently been used as agricultural cropland. Prior to agrarian settlement, the land cover was hardwood forest with pockets of wet prairie. As part of the development of the greenway for this area, select areas currently used as cropland could be re-established with native plant communities, which would result in community aesthetics, a wildlife habitat, and reduced maintenance requirements.

### IMPLEMENTATION

---

Preservation of the community's natural resources can be accomplished using several different approaches, including developer park land dedication, City acquisition, and conservation or trail easement dedication. The City should pursue developer dedication of designated parcels as abutting areas are developed and commit its resources to purchasing other critical parcels to maintain a continuous greenway system.

The incorporation of constructed stormwater treatment areas within new developments provides both opportunities and challenges. Opportunities exist to create linear corridors that simultaneously treat stormwater runoff, provide wildlife habitat, enhance community aesthetics and promote recreational walking and biking. At the same time, these greenways will require on-going maintenance to ensure they function as community amenities. The aesthetic and long-term maintenance implications of various stormwater treatment options (i.e. open water stormwater ponds versus rain gardens, which are only wet for a day or two after a rainfall, or formal plant arrangements versus natural plant massings) must be evaluated prior to their implementation to balance the aesthetic desires of the community with the maintenance costs.

Native plants have been successfully used in stormwater treatment areas. A proper mix of native plants can filter sediments from the stormwater, uptake excess nutrients in the water and will tolerate both drought conditions as well as temporary wet periods. Use of these species is still relatively new in many communities and may require educational sessions with community residents to help them understand and appreciate the aesthetics of these plant communities.

### **Support Facilities**

Due to the sensitive nature of many of the areas preserved as community greenways, it is assumed that the greenways will primarily provide passive recreational opportunities such as walking and nature observation. Support facilities for passive uses should be developed within the preservation areas. The backbone of these facilities should be trails, which provide interpretive and walking functions in a manner that has minimal resource impacts. Trailheads should be developed to provide convenient access points from neighborhoods to the open space parcels. Facilities typically found at trailheads include orientation/directory signage, satellite toilet enclosures, drinking water fountains, natural resource education exhibits and possibly small parking lots. Trail features, such as boardwalks, overlooks and interpretive stops should be developed in a manner compatible with the topography, vegetation and trail system.

### Conservation Area Management Plans

As conservation areas are established, the City should develop management plans for these areas that include guidelines for:

- Protecting, enhancing and maintaining the biological diversity and aesthetic appeal of these areas
- Establishing the appropriate balance between resource preservation and recreational use
- Developing and controlling public access
- Implementing interpretive signage to help educate citizens about these valuable resources.

The management plans should further establish goals for renovating existing degraded areas, such as invasive species removal, erosion, stormwater treatment to improve water quality, and native plant restoration. The City should develop a separate budget to accomplish to manage the resource base and to develop and maintain support facilities such as parking lots, trail heads and trails within these areas.

## TRAILS

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Comprehensive and interconnected sidewalk and trail systems are integral to a community as they provide numerous recreational, environmental, alternative transportation and health benefits. As traffic volumes continues to increase, biking offers an alternative transportation mode, which reduces traffic congestion, emissions and noise, while also providing health benefits. Walking and biking is a simple approach to solving two issues, obesity and the need for healthy lifestyles, which are currently being addressed by many health organizations. Many citizens are looking for sidewalk and trail systems within their communities as they equate them with a high quality of life. Finally, the issue of childhood obesity has been one impetus for communities to re-think how children can get exercise. The Federal Highway Administration has initiated a program to help communities create safe routes to school that allows students the opportunity to walk and bike to school versus taking a bus. Each of these health and safety issues can be addressed or mitigated with an effective trail system.

## INVENTORY

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### Existing Trails and Sidewalks

Currently several regional trails pass through the City of Mankato. Of particular importance to the project area is the Sakatah State Trail that is located approximately 1.5 miles north of the district. The Sakatah State Trail extends west to the Minnesota River where it connects with the Minnesota River Trail and extends east approximately 35 miles to the City of Faribault. Another important regional trail is the South Route Trail along CSAH 90. New trails developed as part of the project area should be designed to extend towards both the Sakatah and South Route Trails (see Figure 2 – Trail and Sidewalk Plan).

In April 2006, the City updated its Proposed Sidewalk and Trail Plan. This plan provides a fairly extensive system of planned and existing sidewalks and trails throughout the City. Within the project area, the plan shows existing and proposed trails and sidewalks along TH 22 and several existing sidewalks in the vicinity of Adams Street and Madison Avenue. No other trails or sidewalks are indicated for the project area in the City's Proposed Sidewalk and Trail Plan.

### Existing Utility and Railroad Corridors

An existing gas line corridor crosses the northeast corner of the project area. This utility corridor provides the opportunity to create trail connection between the Greenway near Highway 14 and Madison Avenue.

## SYSTEM DEVELOPMENT AND MAINTENANCE GOALS

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### Trail Development Goals and Objectives

The following sections describe the goals and objectives that should guide trail and sidewalk development in the project area. These goals provide objectives for decision makers to use as a basis for determining allocations of resources. Goals also assist



## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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the decision makers as they make commitments to trail development through the application of financing policies, facility design standards, user policies, maintenance and operations and citizen input.

#### General Considerations

Overall, many trail systems' goals are to:

- Reflect citizen needs and be consistent with the City's Park and Open Space Plan
- Provide year-round multiple use
- Be consistent with County and State objectives and coordinated with these implementation efforts
- Be developed and maintained in a cost effective manner
- Extend the city-wide trail system in a way that minimizes potential conflicts between trail users and motor vehicles and ensures the safety of trail users.

#### Functional Considerations

The utility of the system to a user is an important element of a functional trail system. Access, connections to key destinations, integration with greenways and open space and multi-use facilities are all elements of the functional considerations that need to be considered in system design and maintenance.

The functional considerations for the trail system are to:

- Make connections to the Sakatah State Trail and South Route Trail (CSAH 90)
- Make a trail connection to the City of Eagle Lake
- Incorporate a regional trail within the proposed 200-foot right-of-way for CSAH 12
- Utilize a hierarchy of system elements
- Link neighborhood, educational, recreational and other community activity nodes and tie into other trail facilities
- Conserve or preserve natural amenities, incorporate trails into greenway corridor and stormwater treatment corridors when possible, and provide a buffer between incompatible land uses

#### Design Considerations

The trail system design must reflect user needs and trail function. Safety and aesthetics as well as user comfort must also be considered.

The design considerations for the trail system within the project area is to:

- Utilize but remain sensitive to natural areas
- Consider roadway and utility easements to assemble trail corridors
- Provide ample access and comfort/support facilities
- Incorporate the trail system into new residential and commercial areas as they emerge
- Ensure design consistency with other trail systems

## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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- Apply design guidelines with modifications that reflect unique local conditions

#### Maintenance Considerations

As the system expands, it is important to consider the long term maintenance and operations impact of new trail facilities.

The maintenance considerations for the trail system are to:

- Generate minimal maintenance that can be handled by the City maintenance staff
- Encourage user upkeep and minimize vandalism

#### Health, Safety, and Welfare Considerations

The health, safety and welfare considerations for the trail system are to:

- Provide safe routes to neighborhood schools and parks
- Create a livable community with high level of pedestrian amenities that provide a comfortable and safe pedestrian environment
- Create a positive impact on Mankato's quality of life
- Ensure compatibility with adjacent landowners and land use patterns
- Integrate safety consideration into the trail system through design and regulation
- Protect adjacent property from unauthorized use by trail users

#### Programming and Financing Considerations

The programming and finance considerations for the trail system are to:

- Ensure that the design, construction and maintenance costs associated with the trail system are within the fiscal capacity of the City
- Make use of all available regional, State and Federal financial assistance to implement the trail system
- Employ a long-term implementation strategy to maintain and further develop the trail system

### DEFINITION OF TRAIL SYSTEM ELEMENTS

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#### **Trail Classifications**

The following trail types are proposed within the project area:

#### Regional Trail

- Location and Purpose
  - Within an independent trail corridor
  - Serves both recreational and transportation purposes
  - Serves pedestrians, bicycles and in-line skaters

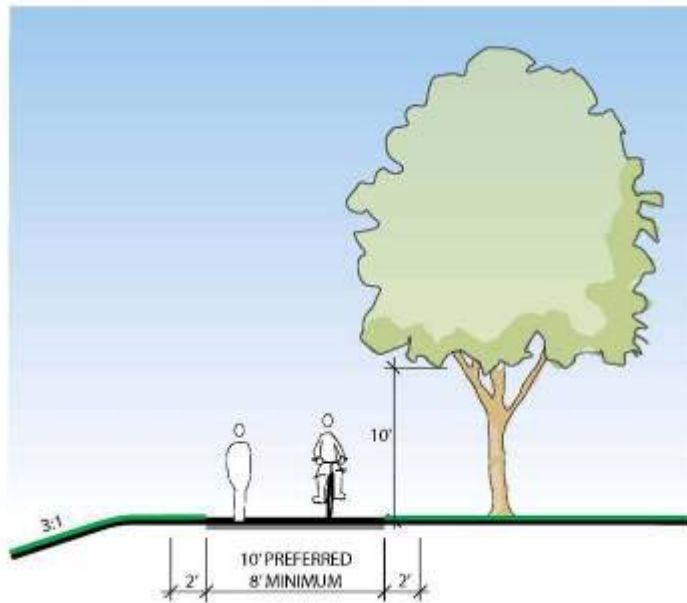
## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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- Design Criteria
  - 10-foot width preferred (8-foot minimum), bituminous pavement

A ten-foot trail is preferred as this width is recommended by both the American Association of State Highway and Transportation Officials (AASHTO) and the Minnesota Department of Transportation (Mn/DOT) for trails that will serve two-directional, pedestrian and bicycle traffic. If the City secures federal funding for trail construction, the design of the federally funded trails must comply with Mn/DOT Bicycle design guidelines.



**Figure 1. Regional Trail Typical Section**

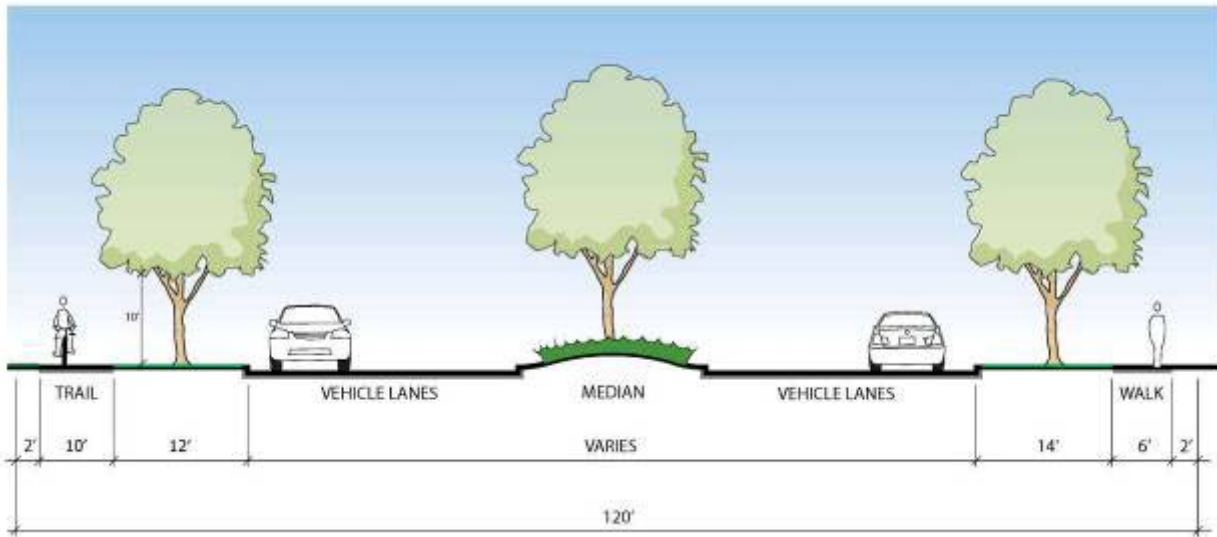
## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

#### Commuter Trail

- Location and Purpose
  - Along one side of all major collector and arterial roadways. Within the project area, commuter trails will be spaced approximately in 1/2 mile increments.
  - Primarily serves transportation purposes (i.e. provides routes to work, retail, schools, and recreational destinations)
- Design Criteria
  - 10-foot (preferred), 8-foot width (minimum), bituminous pavement
  - Trail setback 10-foot (minimum) from roadway

A ten-foot trail is preferred as this width is recommended by both the American Association of State Highway and Transportation Officials (AASHTO) and the Minnesota Department of Transportation (Mn/DOT) for trails that will serve two-directional, pedestrian and bicycle traffic. If the City secures federal funding for trail construction, the design of the federally funded trails must comply with Mn/DOT Bicycle design guidelines.



**Figure 2. Commuter Trail Typical Section**



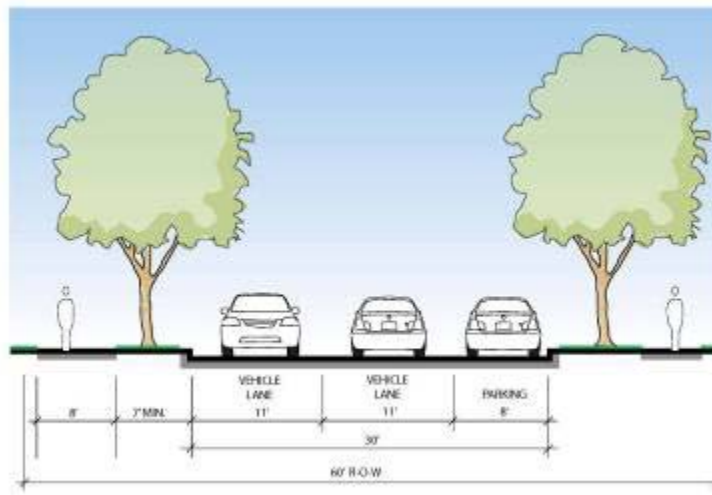
## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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#### Local Trail

- Location and Purpose:
  - Within independent corridors or adjacent to collector /local streets
  - Provide non-motorized routes to neighborhood schools and parks
  - Make connections to community and regional trails
- Design Criteria:
  - 8-foot width (minimum), bituminous pavement
  - If parallel to a street, trail should have a 7-foot (minimum) setback from roadway



**Figure 3. Local Trail Typical Section**

## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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#### Sidewalks

- Location and Purpose
  - On one side of all arterial and collector streets, with the exception of freeways.
  - Along all streets adjacent to commercial uses, if trail not already located there.
- Design Criteria
  - 6-foot width preferred (5-foot minimum), concrete pavement
  - Sidewalk setback 10-foot and 7-foot (minimum) from minor arterials and collector/local streets, respectively.

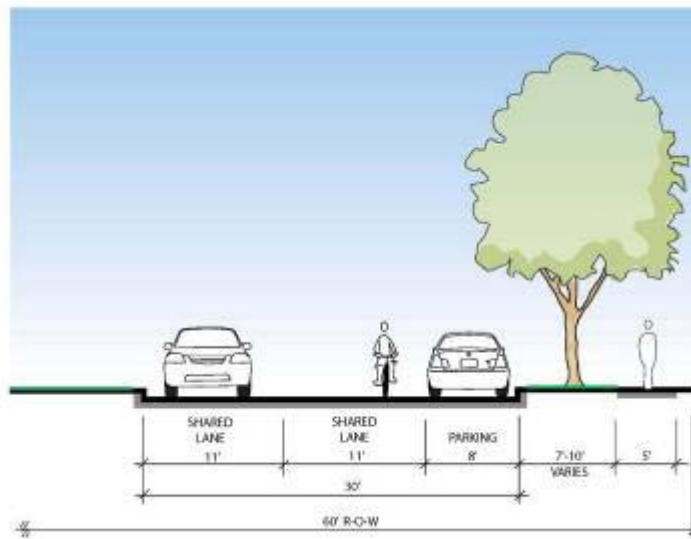


Figure 4 Sidewalk Typical Section

#### Nature Trails

- Location and Purpose
  - In independent corridors within areas of high scenic or habitat quality
  - Provide a variety of natural experiences for a diverse group of users
  - Provide access to natural areas, including wooded and open spaces, flat and hilly terrain and wetland or water features where available
  - Short trails around residential developments used for exercise or interpretive opportunities
- Design Criteria
  - Trails should be wide enough for two persons to walk abreast, with a 3-foot minimum width
  - Mowed turf, woodchip or gravel path preferred (asphalt or concrete pavement for heavy volumes or highly erosive soils)

**Greater East Mankato Infill Service District**  
**PARKS AND OPEN SPACE PLAN**

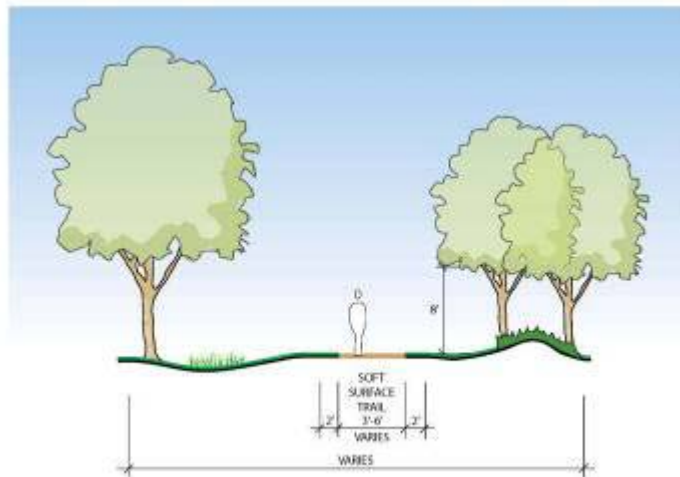
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- Trail Length
  - Nature trails will be determined by desired experiences and destinations.
  - Nature trails should be loop routes to avoid backtracking
- Grade

In general, trails should not exceed 8% percent grade, although 5% is preferred. Trails anticipating use by the disabled should abide by the recommendations of the Architectural and Transportation Barriers Compliance Board's (Access Board) Accessibility Guidelines for Outdoor Developed Areas. These guidelines generally call for slopes less than 5 percent, but allow for steeper slopes in certain instances.
- Surface Material

Surface material should be "firm and stable." Natural surface materials (turf, woodchips or gravel) are preferred.
- Clearing

Trails should be cleared to a sufficient width so that no brush touches users as they walk. Clearing should maintain a minimum 8 foot vertical height and an additional 2 feet to each side of the trail.



**Figure 5. Nature Trail Typical Section**

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## DESIGN AND CONSTRUCTION GUIDELINES

### **Trail Design Standards**

State and Federal design standards are intended to guide the construction of trails in the project area. These standards should be used to review trail construction and direct municipal improvements. Difficult design issues are frequently encountered, and they may require special consideration. Individuals using design standards must review the conflicts on a case-by-case basis to determine deviation from the standards. In arriving at such exceptions, attention should be given to issues

## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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pertaining to user safety, liability, comfort, construction costs and consistency with abutting trail segments.

The following design resources should be consulted as needed.

Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), Most current version.

Minnesota Bicycle Transportation Planning and Design Guidelines, Minnesota Department of Transportation, Most current version.

A Policy on Geometric Design of Highways and Streets (Green Book), American Association of State Highway and Transportation Officials (AASHTO), Most current version.

Minnesota Manual of Uniform Traffic Control Devices (MUTCD), Minnesota Department of Transportation, Most current version.

#### **User Groups**

Many different users, such as runners, walkers, bicyclists, in-line skaters, cross-country skiers and snowshoe hikers, have the potential to use portions the City's trail system during all seasons of the year. Surfacing materials and width of trail are important issues because they effectively determine who will use the trails. For example, bituminous trails will support in-line skaters, bicyclists and walkers; mowed trails will better support cross-country skiers and nature hikers; and a boardwalk structure over a wetland will be attractive to walkers. The specific surfacing materials for trails, or portions of trails, may start out as one material and change over time, depending on the number and type of users.

#### **Street Crossings**

Proposed trails will bisect both low-volume and high-volume roadways. Low-volume roadway crossings should occur at roadway intersections where pedestrian and bicycle activity is expected. These crossings should provide signage and pavement markings to create safe crossings for trail users. Where the trails cross high-volume roadways, at-grade trail crossings should be located at signalized intersections that provide walk signals and marked crosswalks. Any mid-block crossings of high-volume roadways should be grade-separated to ensure trail user safety.

If roundabouts are constructed within the project area, an evaluation should be performed regarding the safety benefits and constraints associated with pedestrians and bicyclists movement through the roundabout. On-street bicyclists must move through the roundabout in a manner similar to vehicles. Experienced bicyclists will not find this a problem, but less experienced bicyclists may be uncomfortable in this situation.



## Greater East Mankato Infill Service District

### PARKS AND OPEN SPACE PLAN

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Pedestrians and bicyclists using a multi-use path must decide when it is safe to cross the roadway because there will not a signal to indicate the appropriate time to cross. If traffic volumes are high, this may be a difficult situation for less experienced bicyclists and pedestrians. Visually impaired pedestrians may also have difficulty moving through roundabouts because there will not be an audible signal to indicate when it is safe to cross the roadway.

Potential safety benefits of a roundabout include reducing the number of potential conflict points between vehicles and pedestrians and potentially reducing the number of travel lanes that a pedestrian crosses at one time.

#### **Amenities**

Trail amenities should be consistent with the amenities placed used throughout the rest of the Mankato park system.

#### Trail Heads

Trail heads, which serve as destination rest areas, should be located at termini and primary access points along regional trails that pass through Mankato. They should be located near points where regional trails enter and exit the City. Amenities to be included at trail heads should include the following:

- Bench
- Trash receptacle
- Bike rack
- Directional signage and information kiosk
- Shade

Optional amenities at trail heads could include the following:

- Restrooms
- Shelter building
- Picnic Tables
- Lighting
- Interpretive signage
- Parking
- Drinking fountain

#### Rest Areas

Rest areas should be located approximately every two miles along regional trails. Rest area amenities should include the following:

- Bench
- Trash receptacle
- Bike rack
- Directional signage
- Shade

Optional amenities at rest areas could include the following:

- Drinking fountain
- Information kiosk
- Interpretive signage
- Satellite toilet enclosures if rest area is located within a greenway or next to a significant trail feature

## **Signage**

### Informational Signage/Wayfinding

As with park signage, trail informational signage should be considered part of the comprehensive branding effort that includes the City's logo and possibly a route numbering system to help people easily identify and navigate the trail system. Efforts should be made to develop a signage package that provides geographical reference ("you are here"), identifies points of interest and provides distance and directional information.

Informational signage should respond to the following considerations:

- Design signs and sign supports with a consistent theme
- Limit number of signs to reduce visual clutter
- Locate signs at trail heads and other trail access points.
- Directional signs spaced approximately every 1 mile
- Informational kiosks approximately every 2 miles
- Ordinance signs must be placed at major access points for enforcement to be effective

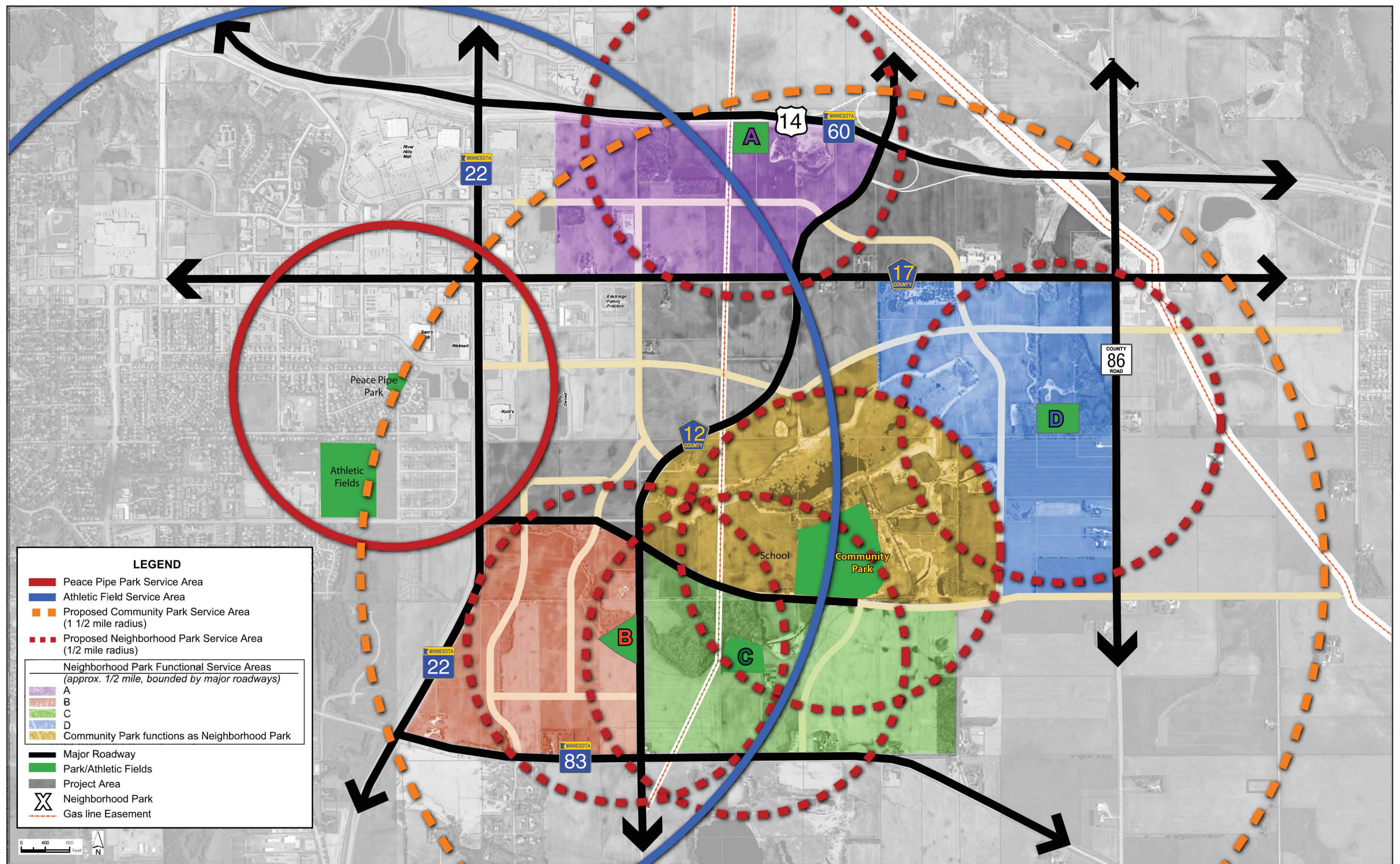
### Regulatory signage

Regulatory signage (stop signs, steep slope signs, etc.) should be consistent with the appropriate state and federal guidelines.

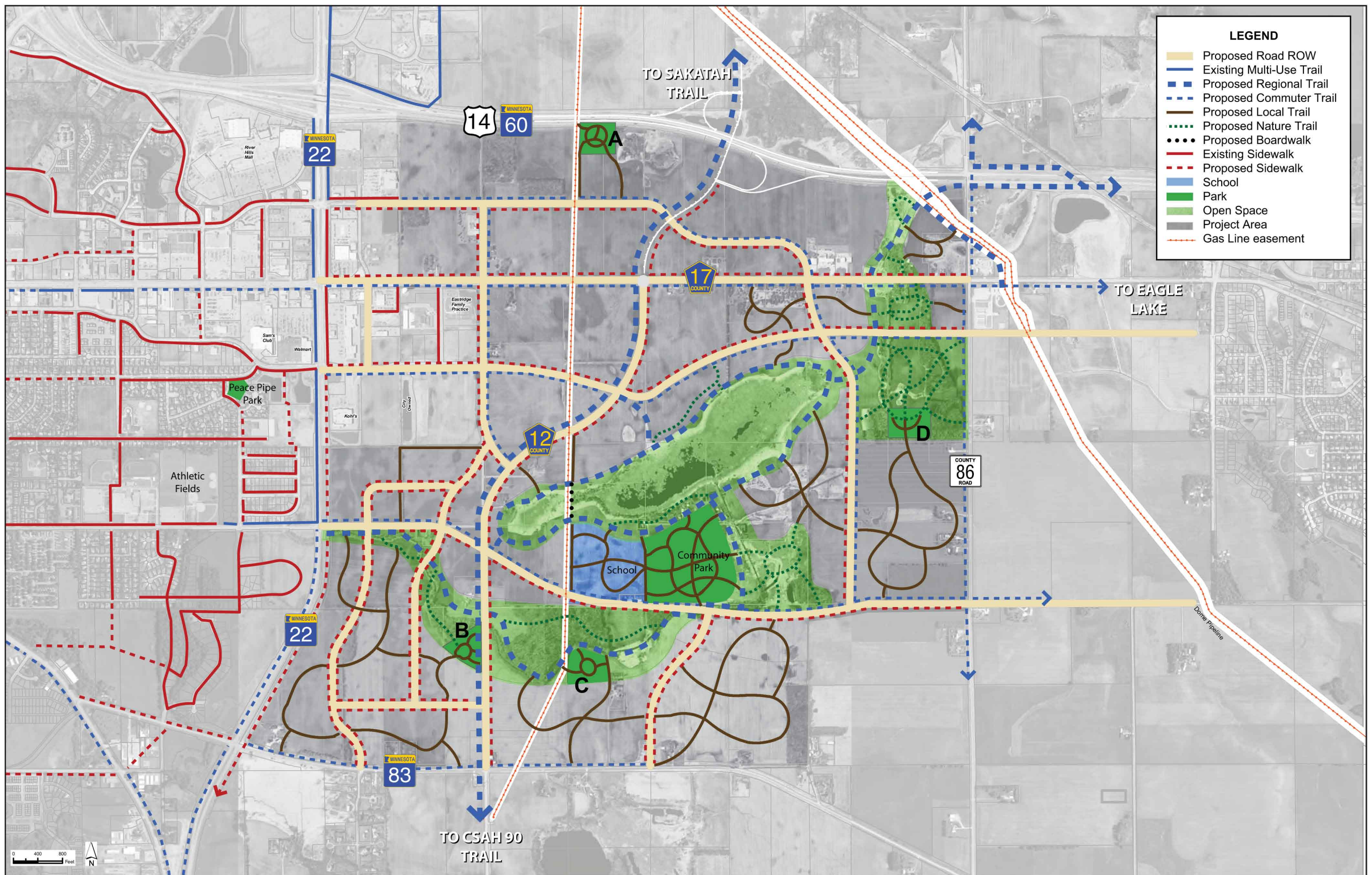
Regulatory/traffic signage should respond to the following considerations:

- Signs must conform to State (MN MUTCD) standards
- Signage and striping of major street crossings should be given due consideration to assure a safe crossing environment for trail users
- Trails should cross roads at intersections whenever possible. Mid-block trail crossings of roads should be avoided.











**APPENDIX I.**  
**Comments Received During 30-day Comment Period**

**Mayor**  
Tim Auringer

**Councilmembers**  
Adlor Olsen  
Hub Ericksen  
Aaron Hager  
Scot. O. Quist

**City Administrator**  
Brad Potter

# CITY OF EAGLE LAKE

101 Plainview St., P.O. Box 159  
Eagle Lake, MN 56024  
Phone: (507) 257-3218  
Fax: (507) 257-3220



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April 11, 2007

Paul Vogel  
Community Development Director  
City of Mankato  
10 Civic Center Plaza  
PO Box 3368  
Mankato, MN 56002-3368

Dear Mr. Vogel:

This letter is in regards to the Greater East Mankato Infill Service District Alternative Urban Areawide Review (AUAR). Thank you for allowing us to review the document and provide comments. We appreciate your planning efforts as Mankato and Eagle Lake grow together.

Our comments regarding the AUAR include the following:

Transportation

We agree with the future extension of Hoffman Road that will one day connect with 211<sup>th</sup> Street within the City of Eagle Lake. We also concur with the Bassett Drive extension south of Blue Earth County State Aid Highway 17. We are planning for these transportation connections as well.

Water

The City acknowledges the extension of a 16 inch water main that would possibly serve Eagle Lake in the future. The City currently has its own well system, however, would like to keep this option open and the City of Eagle Lake will plan water main sizes accordingly.

Sanitary Sewer

The City of Eagle Lake is a partner with the Mankato Regional Wastewater Treatment Center and has found this arrangement to be beneficial. Currently the City of Eagle Lake has a 14 inch sanitary sewer force main from Eagle Lake to the connection point near Snell Motors in Mankato. The City of Eagle Lake maintains the force main to the connection point near Snell Motors. As development occurs to the east of Mankato, the City of Eagle Lake would like consideration given to shortening the force main length by intercepting it with future City of Mankato sanitary sewer extensions along the Blue Earth County State Aid Highway 17 area.

Once again, the City of Eagle Lake appreciates your planning efforts with this process. Please feel free to contact us with any questions at (507) 257-3218.

Sincerely,

Brad Potter  
City Administrator



## Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, MN 55155-4194 | 651-296-6300 | 800-657-3864 | 651-282-5332 TTY | [www.pca.state.mn.us](http://www.pca.state.mn.us)

April 11, 2007  
VIA FACSIMILE

Mr. Paul Vogel  
Community Development Director  
City of Mankato  
10 Civic Center Plaza, P. O. Box 3368  
Mankato, MN 56002-3368

RE: Greater East Mankato Infill Service District  
Draft Alternative Urban Areawide Review

Dear Mr. Vogel:

Thank you for the opportunity to review and comment on the Greater East Mankato Infill Service District draft Alternative Urban Areawide Review (AUAR). Based on the information contained in the draft AUAR, and regarding matters for which the Minnesota Pollution Control Agency (MPCA) has regulatory responsibility and other interests, the MPCA Environmental Review Unit staff offers the following comments.

### Wetlands

#### • Project Description (Item 6)

Of the approximately 2,100 acres within the AUAR study area, roughly 460 are targeted to remain "open space" (Table 6-1). While it is understood that this category comprises more than wetlands, the MPCA requests the addition of a separate row to Table 6-1 to clearly identify the estimated amount of wetlands that will remain under each scenario. It is noted that Table 10-1 identifies approximately 108 acres of wetland currently existing within the AUAR area. Optimally, since impacts to these wetlands must be avoided when prudent and feasible alternatives exist (discussed below), this table would then identify 108 acres of wetland acreage remaining under each scenario. The land use descriptions in Table 6-2 would also need to be amended to include wetlands as a category separate from "open space."

#### • Permits Required (Item 8)

The draft AUAR comprehensively identifies the federal, state and local requirements governing wetland protection; however, due to a recent change at the MPCA, it does not accurately describe the MPCA's current level of involvement in the Clean Water Act Section 401 process. It was recently decided that certain situations merit an independent Section 401 review (e.g., those that are within impaired waters/total maximum daily load [TMDL] areas), so the footnote should be removed from Table 8-1 in the final AUAR. It should also explain how, under the Clean Water Act, the Section 401 Certification process requires: a) the MPCA to ensure projects required to obtain a Section 404 Permit from the Corps of Engineers will comply with the state water quality standards in Minn. R. ch. 7050; and b) any conditions required by the MPCA 401 Certification are then required to be incorporated into the Corps 404 Permit.

Mr. Paul Vogel  
April 11, 2007  
Page 2

- Projected Land Use (Item 9)

The draft AUAR states that "All areas within the AUAR area will need to meet wetland guidelines..." It is unclear what guidelines are being referenced. The laws and rules governing wetlands are regulatory requirements and should not be considered guidance. Please revise this statement accordingly for the final AUAR. Also, Table 9-2 identifies 357 acres of park/open space, which is inconsistent with the estimated 465 acres identified earlier in the section and the 460 acres identified in Item 6. Please revise these figures accordingly or include an explanation for why they are different.

- Wetland Impact Avoidance and Minimization (Items 11, 12, 16, and 17)

As with the Corps regulations and the Wetlands Conservation Act, the MPCA rules governing wetlands (Minn. R. 7050.0186) require that impacts to wetlands be avoided when prudent and feasible alternatives exist. When impacts cannot be avoided, the MPCA rules require impacts to be minimized. Only when efforts to avoid and minimize impacts have been exhausted can compensatory mitigation be considered. Please identify the MPCA rules in the final AUAR.

In general, the MPCA finds the draft AUAR did not place enough emphasis on the steps that will be taken to ensure wetland impacts will be avoided when developing this area. Due to the lack of current development in the area, it is expected that prudent and feasible alternatives exist, and that wetland impacts can be avoided. The final AUAR should identify the possible circumstances under which impacts to wetlands can genuinely be considered anything but avoidable. It should also outline the specific requirements that developers must follow and incorporate into their development plans/plats to ensure none of the lots will be developed in a manner that will unnecessarily impact wetlands.

Item 17 (page 34) cites a city of Mankato (City) zoning ordinance that requires no more than 40 percent of a lot be covered by structures. We recognize and appreciate the City's efforts to restrict the building of structures, which are a main source of impervious surface. Uncontrolled increases of impervious acreage by property owners would likely result in detrimental impacts due to the wetlands being inundated and/or receiving untreated stormwater runoff discharges, both of which are considered violations of applicable MPCA rules and regulations. The MPCA is concerned that the existing ordinance does not address other sources of impervious surface, such as pavement, and questions whether the ordinance is adequate to control the overall creation of additional impervious acreage from all sources in the developing area, resulting in a runoff capacity greater than the stormwater treatment system is designed to handle.

In addition to the City wetland setback requirements, which are laudable, the final AUAR should also discuss how buffers will be used to mitigate possible detrimental effects upon the existing wetlands so their continued existence can have lasting ecological effects. Further, consideration should be given to placing these wetlands and buffers into a city, county, or state-owned easement to legally protect them from property owner actions.

The draft AUAR discusses the possibility of constructing wetlands in some areas as an alternative to conventional stormwater treatment methods. Please note in the final AUAR that the MPCA does not consider wetlands that are constructed primarily to treat a developed area's stormwater to be eligible for mitigation credit. This is because these wetland have the potential to be largely degraded due to the inundation of water and accompanying pollutants.



Mr. Paul Vogel  
April 11, 2007  
Page 3

• Impaired Waters (Items 12, 17, and 29)

As stated in the draft AUAR, the project area is located within the Minnesota River-Mankato and Le Sueur River major watersheds, both of which are listed for various impairments, including turbidity, fecal coliform, mercury, dissolved oxygen and PCBs. The draft AUAR (page 70) correctly acknowledges how stormwater impacts have the "potential to overwhelm existing water systems including ravines, creeks and rivers, possibly leading to the destruction of habitat, erosion problems, downstream sediment deposits, and/or an increase in nutrient levels." Such impacts have the potential to directly exacerbate the impairment of the Le Sueur River and the Minnesota River. Therefore, as acknowledged in the draft AUAR, these potential effects must be mitigated in order to circumvent the exacerbation of the current impairments. This can be done through multiple approaches. First, as stated above, impacts to existing wetland can and should be avoided. Secondly, if avoidance is genuinely not possible, mitigation of wetlands should occur by restoring wetlands within the boundaries of the AUAR rather than through wetlands banking and creation. As part of this restoration, tiling within wetland areas should be removed and natural wetlands restored.

Stream velocity is of concern and can contribute to impairments within a watershed. The mitigation proposed to decrease stream velocities within Wilson Creek by reducing the size of the outletting culvert from 60 inches to 30 inches (p. 38) is not recommended as the sole solution to the issue of stream velocity. Rather - along with the removal of tiles, the utilization of green space outlined in the draft AUAR, and restoration of wetlands - the restoration of County Ditch No. 12 to a natural meandering stream will allow for decreased pulsing, reduced discharge rates and improved water quality.

The City has the opportunity, through the choices it makes in the development of this project area, to not only mitigate the impacts of the proposed development, but also to assist with ground-water recharge and in reaching future goals set forth within the TMDLs. This can help avoid future costly restorative actions required in TMDL implementation plans.

Wastewater (Item 18)

The draft AUAR (page 41) states that the Mankato Wastewater Treatment Plant (WWTP) is not anticipated to need any improvements to increase treatment capacity as a result of the project. However, when continued growth in other areas, such as Lake Washington Sanitary District and the addition of new areas, such as Madison Lake are also considered along with the proposed AUAR project area, it is anticipated that the WWTP *will* need improvements to increase treatment capacity. The WWTP's permitted average wet weather (AWW) flow is 11.25 million gallons per day (MGD). The WWTP has had AWW flows of 10.3 MGD and 9.4 MGD in 2005, and an AWW flow of 9.8 MGD in 2006. This does not leave a lot of room for additional growth over existing conditions without raising some concerns over consistent treatment capabilities of the WWTP. Please address this issue in the final AUAR. If you have any questions about the Mankato WWTP or wastewater treatment in general, please contact Mr. Eulale Mathiasen at 651-296-7195.

Noise (Item 24)

Although it will be the responsibility of the developer(s) to ensure that noise levels do not exceed the standards in Minn. R. ch. 7030, noise mitigation measures should still be included in the mitigation plan. Imperceptible increases in noise levels do not ameliorate a violation and noise must be addressed for future residential areas within the AUAR limits. While this is included in Item #24, it should also be addressed in the mitigation plan.

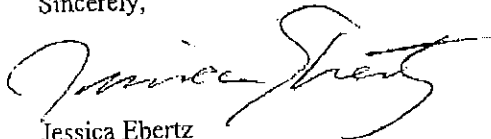
Mr. Paul Vogel  
April 11, 2007  
Page 4

Please note that vegetation is not an effective noise barrier (FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108). Vegetation must be dense, 30 meters deep and 5 meters above the line of sight to reduce noise levels by 5 dBA.

Any questions about noise standards should be directed to Anne Claflin, 651-282-6672.

Again, thank you for the opportunity to review this project. We look forward to receiving your responses to our comments. Please be aware that this letter does not constitute approval by the MPCA of any or all elements of the project for the purpose of pending or future permit action(s) by the MPCA. We may have additional comments or requests for information in the future to address specific issues related to the development of MPCA permit(s). Ultimately, it is the responsibility of the project proposer to secure any required permits and to comply with any requisite permit conditions. If you have any questions concerning our review of this draft AUAR, please feel free to contact me at 651-296-8011.

Sincerely,



Jessica Ebertz  
Planner Principal  
Environmental Review and Operations Section  
Regional Division

JE:mbo

cc: Kevin Molloy, MPCA, St. Paul  
Bill Thompson, MPCA, Rochester  
EuDale Mathiason, MPCA, St. Paul  
Anne Claflin, MPCA, St. Paul

## Fax Cover Sheet

**Minnesota Pollution Control Agency**

Regional Division  
St. Paul Office  
520 Lafayette Road North - St. Paul, MN 55155

|   |  |   |   |
|---|--|---|---|
| <b>Date:</b>  | 4/11/07  | <b>Number of pages (including this page):</b> | 5 |
| <b>To:</b>  | Mr. Paul Vogel                                       |   |   |
| <b>Company or agency:</b>   | City of Mankato Community Development Director       |   |   |
| <b>Fax number:</b>  | 507-387-6845   |   |   |
| <b>Subject:</b>   | Greater E Mankato Infill Service District Draft AUAR |   |   |
| <b>Message:</b>   | See attached pages                                   |   |   |
|   |  |   |   |
|   |  |   |   |
|   |  |   |   |
| <b>From:</b>  | Jessica Ebertz                                       |   |   |
| <b>Division:</b>  | Regional Division                                    |   |   |
| <b>Telephone number:</b>  | 651-296-8011   |   |   |
| <b>Fax number:</b>  | 651-297-2343   |   |   |
| <b>If you have any questions regarding this fax, please call:</b> |  | 651-297-8510                                  |   |



# Minnesota Department of Natural Resources

500 Lafayette Road  
St. Paul, Minnesota 55155-4025

April 10, 2007

Mr. Paul Vogel, Community Development Director  
City of Mankato  
10 Civic Center Plaza, P. O. Box 3368  
Mankato, MN 56002-3368

RE: Greater East Mankato Infill Service District Draft Alternative Urban Areawide Review

Dear Mr. Vogel:

The Department of Natural Resources (DNR) has reviewed the Draft Alternative Urban Area Review (AUAR) for the Greater East Mankato Infill Service District, City of Mankato, Minnesota. We offer the following comments for your consideration.

Item No. 10 – Cover types (pp. 16-17)

The Draft AUAR has been prepared according to the Environmental Quality Board specifications for this item. However, it would be useful to show a comparison of the acreage of each general cover type before development to coverage estimated for the three scenarios after development. It is useful to have a before and after cover comparison to show the amount of land converted from vegetative cover to impervious surface, from forest to clearings, etc. The comparison would better enable developers to understand the amount of increase of impervious surfaces and loss of wildlife habitat or forest/grassland cover. Also, the developers would have a better understanding of stormwater management issues as discussed in the following comment.

Item No. 17 - Water quality, surface water runoff (pp. 32-39)

The Minnesota Department of Natural Resource (DNR) requests that further consideration be given to the development of the stormwater management plan in the Draft AUAR. The Minnesota Stormwater Management (MSM) manual is available from the Minnesota Pollution Control Agency (MPCA) to assist your efforts in addressing surface water runoff. The MSM system provides guidance on ways to employ natural features like wetlands, natural topography, undisturbed soils and open space to minimize impacts caused by construction activities and the resulting increase of impervious surfaces on the project area.

The Minnesota Stormwater Manual serves as a valuable resource for professional stormwater managers, introduces newcomers to the stormwater management field and provides practical stormwater management practices. The web address for downloading the manual is: (<http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html>). The chapter containing specific information on integrated stormwater management is available at the following web link: (<http://www.pca.state.mn.us/publications/wq-strm9-09.pdf>).

Implementing the MSM approach will require a more complete understanding of the quality and volume of runoff pre- and post development. The goal is to match infiltration rates at the pre-development volume. However, development to enhance or increase local infiltration should be used when possible.

DNR Information: 651-296-6157 • 1-888-646-6367 • TTY: 651-296-5484 • 1-800-657-3929





Mr. Vogel  
April 10, 2007  
Page 2

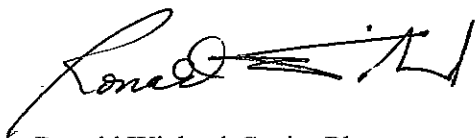
MSM stormwater volume reduction methods that incorporate infiltration, evaporation, storage, conveyance and landscaping techniques should be more clearly defined in the Draft AUAR. This will help the project achieve a sustainable, Low Impact Development (LID) standard. The MSM manual encourages developers to use a multifaceted approach by incorporating a variety of techniques to reduce the rate and volume of runoff. Employing these design features will increase the sustainability of the project by minimizing the destructive aspects of excessive stormwater flow both on-site and downstream from the site.

Selecting the Best Management Practices (BMP) that are cost effective and simple to apply will pose considerable challenges. This may require taking a step back from project developments completed thus far. If BMPs are implemented, there will be considerable benefits realized throughout the project area. Overall aesthetics of the site and the value of project developments will increase. Current and future MSM techniques can and will be virtually invisible, less expensive to create and maintain, and will require fewer infrastructure requirements.

We are pleased with your efforts to protect and buffer the large wetland corridor. In addition, we suggest that the development incorporate additional green space in other parts of the DAUAR project area. Interspersing green space throughout the project area and establishing proper zoning and development ordinances will effectively raise the environmental quality of the entire project area. Prospective residents of new subdivisions increasingly value the chance of living closer to parks and open spaces.

Thank you for the opportunity to review this document. Please contact me with any questions regarding this letter.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ronald Wieland', with a stylized flourish at the end.

Ronald Wieland, Senior Planner  
Environmental Review and Planning Unit  
Division of Ecological Services  
(651) 259-5157

c: Mark Matuska, Todd Kolander, Steve Colvin, Matt Langan, Lisa Joyal

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# BLUE EARTH COUNTY

*Effectively and Efficiently  
Delivering Essential Services*

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District 2 Tom McLaughlin  
District 3 Katy Wortel  
District 4 Will Purvis  
District 5 Kip Bruender

## Courthouse

204 S. Fifth St.  
PO Box 8608  
Mankato, MN 56002

## Administration

TEL: 507-304-4284  
FAX: 507-304-4344

## Finance

TEL: 507-304-4181  
FAX: 507-304-4077

## Physical Plant

TEL: 507-304-4249  
FAX: 507-304-4203

## Government Center

410 S. Fifth St.  
Mankato, MN 56001

## Human Services

PO Box 3526  
TEL: 507-304-4319  
FAX: 507-304-4379

## Environmental Services

PO Box 3566  
TEL: 507-304-4381  
FAX: 507-304-4431

## Taxpayer Services /

### License Center

PO Box 3524  
Tel: 507-304-4340  
FAX: 507-304-4396

## Veterans Services

PO Box 8608  
TEL: 507-304-4246  
FAX: 507-304-4379

## County Attorney

PO Box 3129  
TEL: 507-304-4352  
Fax: 507-304-4389

## Information Technology

PO Box 8608  
TEL: 507-304-4204  
FAX: 507-304-4355

TDD: 507-304-4399

## Nichols Building

410 Jackson St.  
Mankato, MN 56001

## Corrections

PO Box 3543  
TEL: 507-304-4550  
FAX: 507-304-4585

## Extension

PO Box 8608  
TEL: 507-304-4325  
FAX: 507-304-4059

## Taxpayer Services

PO Box 3567  
TEL: 507-304-4251  
FAX: 507-304-4075

## Public Works

35 Map Dr.  
PO Box 3083  
Mankato, MN 56002  
TEL: 507-304-4025  
FAX: 507-304-4049

## Law Enforcement Center

710 S. Front St.  
PO Box 228  
Mankato, MN 56002  
TEL: 507-387-8710  
TDD: 507-387-5601  
FAX: 507-387-4929

## Library

100 E. Main St.  
Mankato, MN 56001  
TEL: 507-304-4001  
FAX: 507-304-4009

April 10, 2007

Paul Vogel  
Community Development Director  
City of Mankato  
10 Civic Center Plaza  
P.O. Box 3368  
Mankato, MN 56002-3368

Dear Mr. Vogel:

Enclosed are some of the County's comments concerning the draft AUAR for the GEMISD AUAR service area. If you or your consultant have any questions please feel free to call me at 304-4381.

## 12. Physical impacts on water resources.

A Potential Wetland Evaluation was developed by I & S Engineers & Architects to identify potential wetland areas within the GEMISD AUAR service area. Some field identification was also conducted as part of this evaluation. This evaluation is shown as Exhibit J - Hydrology Features Map. Several parcels within the GEMISD AUAR service area have already had a full wetland delineation conducted on them. These areas should be separated out from the potential wetland areas on this map and shown as delineated wetland basins with a different color.

Much of the GEMISD AUAR service area consists of agricultural land. The Wetland Conservation Act (WCA) allows for drainage of agricultural land containing any Type 1 wetland other than hardwood bottoms and Type 2 & 6 wetlands less than 2 acres in size under a agricultural exemption. However, this exemption only applies if the drained land remains in agricultural production for 10 years after the drain tile or ditch was added. The vast majority of the agricultural / drainage exemptions are simply taken rather than permitted (documented with the LGU) underneath an exemption. Because of the possibility for violations of the WCA in regards to areas with recent agricultural drainage, it would be beneficial to identify agricultural land within the GEMISD AUAR service area which has been tiled, ditched, or drained in another fashion anytime in the last ten years. Blue Earth County is familiar with at least one agricultural field in the GEMISD AUAR service area which contained wetland prior to a drainage swale and tile addition / repair. This area is just east of Highway # 22 in a location which may very easily be developed in the near



future and does not current show up on Exhibit J - Hydrology Features Map.

### **13. Water use.**

The EAW guidance for this section clearly indicates that the Minnesota Department of Health recommendation is to conduct a complete field well inventory on properties affected by the proposed project. This apparently has not happened with only some limited data gathered from County Well Index (CWI). Exhibit 0 - Water Supply System Plan shows the approximate location of wells identified in CWI. However, these wells are not appropriately labeled with their unique well numbers as indicated underneath the description for this section. The County Well Index typically only identifies wells which are in use or drilled after 1974. A few older wells which have been identified by the Minnesota Geological Survey (MGS) may be listed in the CWI. A quick review of the Blue Earth County well records indicates 17 additional wells within the GEMISD AUAR service boundary which have been properly sealed by a licensed well contractor and issued H-Series sealing numbers. For planning purposes this well sealing information would also be helpful to be included in this AUAR.

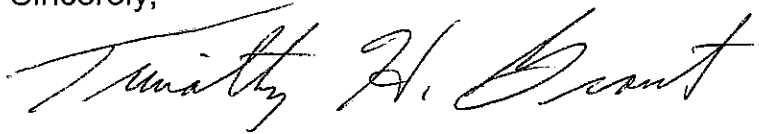
There are 34 building sites located within the GEMISD AUAR service boundary. Most of these building sites contain homes which are probably serviced by privately owned water wells. A map showing all of the existing building locations alongside of or included with the updated Water Supply System Plan map (Exhibit 0) would be beneficial for the sewer & water extension projects projected for the GEMISD AUAR service area. The updated Water Supply System Plan map (Exhibit 0) should show the Unique & H-Series numbers for all of the known wells within the GEMISD AUAR service area. Specific information about the age of all of the existing structures on each of the existing building sites may be obtained from: [www.blueearth.minnesotaassessors.com/](http://www.blueearth.minnesotaassessors.com/). This information may be combined with information assessable from the CWI to help determine if an existing building site is likely to contain an abandoned well or not. For instance, if CWI indicates that the current well in use was drilled in 1979 and the above website indicates that the original home on that same property was constructed in 1905 then there is a very high likelihood that the site contains at least one abandoned well, if not more than one, which would need to be located and properly sealed. It even appears that the inquiry from I & S to the local MDH personnel concerning public water suppliers within the GEMISD AUAR service area has spurred the MDH to order the sealing of an abandoned well located at the KTOE site.

An assessment should be made within the GEMISD AUAR service area to identify any old building sites which are no longer present. This will provide locations within the GEMISD AUAR service area which will likely be required to have an abandoned well search conducted prior to any future development.

There is a test well drilled on June 06, 1975, identified by unique well # 213687 which is located within this GEMISD AUAR service area. This well was field verified and gamma logged by the MGS. The well log reveals that this test well is 605 feet deep with no casing! There is currently no record showing that this test well has been properly sealed. This well

record reveals that this well consists of a multi-aquifer well which extends through the St. Peter/Prairie-Du-Chein/Jordan aquifer, St. Lawrence confinement unit, Franconian/Ironton-Galesville aquifer, and into the Eau Claire confinement unit. This well, if not properly sealed, presents a distinct danger to the local groundwater supply in this area. This well is currently not under the jurisdiction of Blue Earth County but is under the jurisdiction of the Minnesota Department of Health (MDH). Peter Zimmerman of the Rochester MDH office may be contacted regarding this test well.

Sincerely,

A handwritten signature in black ink, reading "Timothy H. Grant". The signature is written in a cursive style with a large, stylized "T" and "G".

Timothy H. Grant R. S.  
Environmental Health / Wetland Specialist



**APPENDIX J.**  
**Response to Comments**

## **RESPONSE TO COMMENTS**

### **GREATER EAST MANKATO INFILL SERVICE DISTRICT (GEMISD) AUAR Mankato, Minnesota**

**June 1, 2007**

#### **INTRODUCTION**

Notice of the Draft Alternative Urban Areawide Review (AUAR) for the Greater East Mankato Infill Service District (GEMISD) was published in the EQB Monitor March 12, 2007. The 30-day comment period ended April 11, 2007. During the comment period, four comments were received:

1. Brad Potter, City of Eagle Lake
2. Jessica Ebertz, MN Pollution Control Agency
3. Ronald Wieland, MN Department of Natural Resources
4. Tim Grant, Blue Earth County

We would like to thank those who took the time to review the Draft AUAR for the GEMISD and for submitting comments. This memo addresses the comments made to the City of Mankato (City) concerning the AUAR. The questions and comments received, along with these responses, will be included as part of the environmental review documents.

According to MN Rules 4410, Chapter 4410.3610, Subpt 5, Procedures for Review, comments made must address the accuracy and completeness of the information provided in the draft analysis, potential impacts that warrant further analysis, further information that may be required in order to secure permits for specific projects in the future, and mitigation measures or procedures necessary to prevent significant environmental impacts within the area when actual development occurs. The City shall revise the environmental analysis document based on comments received during the comment period. The City shall include in the document a section specifically responding to each timely, substantive comment received that indicates in what way the comment has been addressed. If the City believes a request for additional analysis is unreasonable, it may consult with the EQB chair before responding to the comment. The City has included in the document a plan for mitigation specifying the mitigation measures that will be imposed upon future development within the area in order to avoid or mitigate potential environmental impacts. The plan contains a description of how each mitigation measure will be implemented, including a description of the involvement of other agencies, if appropriate.

After all comments have been addressed, the City will distribute the revised environmental analysis document in the same manner as the draft document and also to any persons who commented on the draft document and to the EQB staff. State agencies have ten days from the date of receipt of the revised document to file an objection to the document with the City of Mankato. A copy of any letter of objection must also be filed with the EQB staff. An objection may be filed only if the agency filing the objection has evidence that the revised document contains inaccurate or incomplete information relevant to the identification and mitigation of potentially significant environmental impacts or that the proposed plan for mitigation will be inadequate to prevent potentially significant environmental impacts from occurring.

Unless an objection is filed, the City will adopt the revised environmental analysis document and the plan for mitigation at its first regularly scheduled meeting held 15 or more days after the

distribution of the revised document at the June 25<sup>th</sup> City Council Meeting. In general, three areas of concern were identified in the comments:

1. Wetland preservation and protection,
2. Water Quality, Stormwater & Impaired Waters, and
3. Groundwater Protection.

## **RESPONSE TO COMMENTS ON THE DRAFT AUAR**

### **1. Brad Potter, City Administrator, City of Eagle Lake**

*This letter is in regards to the Greater East Mankato Infill Service District Alternative Urban Areawide Review (AUAR). Thank you for allowing us to review the document and provide comments. We appreciate your planning efforts as Mankato and Eagle Lake grow together.*

#### **Transportation**

*We agree with the future extension of Hoffman Road that will one day connect with 211<sup>th</sup> Street within the City of Eagle Lake. We also concur with the Bassett Drive extension south of Blue Earth State Aid Highway 17. We are planning for these transportation connections as well.*

#### **Water**

*The City acknowledges the extension of a 16 inch watermain that would possibly serve Eagle Lake in the future. The City currently has its own well system, however, would like to keep this option open and the City of Eagle Lake will plan watermain sizes accordingly.*

#### **Sanitary Sewer**

*The City of Eagle Lake is a partner with the Mankato Regional Wastewater Treatment Center and has found this arrangement to be beneficial. Currently the City of Eagle Lake has a 14 inch sanitary sewer forcemain from Eagle Lake to the connection point near Snell Motors in Mankato. The City of Eagle Lake would like consideration given to shortening the forcemain length by intercepting it with future City of Mankato sanitary sewer extensions along the Blue Earth County State Aid Highway 17 area.*

*Once again, the City of Eagle Lake appreciates your planning efforts with this process. Please feel free to contact us with any questions at (507) 257-3218.*

The City appreciates the continuous collaboration with the City of Eagle Lake and thanks the city for commenting on the AUAR. The city of Mankato will continue coordination with the City of Eagle Lake regarding transportation extensions and potential future water supply. The city of Mankato will also consider the request to shorten the sanitary sewer supply forcemain while planning the sanitary system extensions to the AUAR area and in the Comprehensive Sanitary Sewer Plan currently underway.

**2. Jessica Ebertz, Planner Principal, Environmental Review and Operations Section, Regional Division, MN Pollution Control Agency**

*Thank you for the opportunity to review and comment on the Greater East Mankato infill Service District draft Alternative Urban Areawide Review (AUAR). Based on the information contained in the draft AUAR, and regarding matters for which the Minnesota Pollution Control Agency (MPCA) has regulatory responsibility and other interests, the MPCA Environmental Review Unit staff offers the following comments.*

**Wetlands**

**Project Description (Item 6)**

*Of the approximately 2,100 acres within the AUAR study area, roughly 460 are targeted to remain “open space” (Table 6-1). While it is understood that this category comprises more than wetlands, the MPCA requests the addition of a separate row to Table 6-1 to clearly identify the estimated amount of wetlands that will remain under each scenario. It is noted that Table 10-1 identifies approximately 108 acres of wetland currently existing within the AUAR area. Optimally, since impacts to these wetlands must be avoided when prudent and feasible alternatives exist (discussed below), this table would then identify 108 acres of wetland acreage remaining under each scenario. The land use descriptions in Table 6-2 would also need to be amended to include wetlands as a category separate from “open space.”*

The City did not use AUAR process to evaluate the potential for development of each parcel of property, but rather to identify the environmental impacts associated with the ‘most intensive scenario’ for certain land use developments. The Draft AUAR did not completely outline the intentions of the City regarding wetland issues, and language has been added to the AUAR regarding wetland investigations, permitting and mitigation. The MPCA requested the addition of a separate row to Table 6-1 be added. However, the purpose of this table is to show the proposed land uses within the AUAR area and the estimated developable acres given a standard floor area ration (FAR) and units per acre. The additional row of data requested would be more appropriate if added to Table 10-1. However, the estimated amount of wetlands within the AUAR boundary is unknown given a wetland investigation has not been completed. An estimate could be made using the NWI, however that would not include all the possible basins in the area and may be considered a misrepresentation. While the amount of wetland area to remain under each scenario is also unknown, it is assumed that since impacts to these wetlands must be avoided when prudent and feasible alternatives exist, that the amount of wetlands currently located within the project area and the amount of wetlands remaining in each scenario will be similar. In addition, wetland areas are included throughout the AUAR area, and not just within the open space corridors.

As mentioned in the AUAR, all development in the AUAR area will be subject to City ordinance once annexation into the City of Mankato is complete. A detailed wetland investigation is required before development occurs on individual parcels within the AUAR area. Wetlands found on the site through the investigation will be handled in accordance to the 1991 Minnesota Wetland Conservation Act (WCA) and the Clean Water Act Section 404 administered by the Army Corps of Engineers. Mankato also has a wetland setback ordinance in place which requires all impervious surfaces to be setback 16.5-feet from a delineated wetland boundary.

**Permits Required (Item 8)**

*The draft AUAR comprehensively identifies the federal, state and local requirements governing wetland protection; however, due to a recent change at the MPCA, it does not accurately describe the MPCA’s current level of involvement in the Clean Water Act*



*Section 401 process. It was recently decided that certain situations merit an independent Section 401 review (e.g., those that are within impaired waters/total maximum daily load [TMDL] areas), so the footnote should be removed from Table 8-1 in the final AUAR. It should explain how, under the Clean Water Act, the Section 401 Certification process requires: a) the MPCA to ensure projects required to obtain a Section 404 Permit from the Corps of Engineers will comply with the state water quality standards in Minn. R. Ch. 7050; and b) any conditions required by the MPCA 401 Certification are then required to be incorporated into the Corps 404 Permit.*

The City of Mankato thanks the MPCA for the information regarding the recent change at the MPCA regarding the Clean Water Act Section 401 process. As requested, the footnote on Table 8-1 will be revised for the Final AUAR. The footnote will read: "Under the Clean Water Act, the Section 201 Certification process requires the MPCA to ensure projects required to obtain a Section 404 Permit from the Corps of Engineers will comply with the state water quality standards in Minn. R. Ch. 7050 and any conditions required by the MPCA 401 Certification will be incorporated into the Corps 404 Permit".

*Projected Land Use (Item 9)*

*The draft AUAR states that "All areas within the AUAR area will need to meet wetland guidelines..." It is unclear what guidelines are being referenced. The laws and rules governing wetlands are regulatory requirements and should not be considered as guidance. Please revise this statement accordingly for the final AUAR. Also, Table 9-2 identifies 357 acres of park/open space, which is inconsistent with the estimated 465 acres identified earlier in the section and the 460 acres identified in Item 6. Please revise these figures accordingly or include an explanation for why they are different.*

The statement in the Draft in the 'projected land use' section in Item 9 which reads, "All areas within the AUAR area will need to meet wetland guidelines ..." has been revised in the Final AUAR as requested to read: "All areas within the AUAR are will need to meet wetland regulatory requirements". In addition, the information provided regarding the number of acres of park/open space incorrectly identified in the AUAR has been reviewed and revised for consistency.

*Wetland Impact Avoidance and Minimization (Items 11, 12, 16, and 17)*

*As with the Corps regulations and the Wetlands Conservation Act, the MPCA rules governing wetlands (Minn. R. 7050.0186) require that impacts to wetlands be avoided when prudent and feasible alternatives exist. When impacts cannot be avoided, the MPCA rules require impacts to be minimized. Only when efforts to avoid and minimize impacts have been exhausted can compensatory mitigation be considered. Please identify the MPCA rules in the final AUAR.*

A section has been added to the appropriate items to identify the MPCA rules governing wetlands.

*In general, the MPCA finds the draft AUAR did not place enough emphasis on the steps that will be taken to ensure wetland impacts will be avoided when developing this area. Due to the lack of current development in the area, it is expected that prudent and feasible alternatives exist, and that wetland impacts can be avoided. The final AUAR should identify the possible circumstances under which impacts to wetland can genuinely be considered anything but avoidable. It should also outline the specific requirements that developers must follow and incorporate into their development plans/plats to ensure none of the lots will be developed in a manner that will unnecessarily impact wetlands.*

Due to the master plan approach and general content of the AUAR, specific information detailing the regulatory steps in wetland permitting was not thoroughly discussed. However, as requested, additional information has been included in the appropriate sections to discuss the steps which will be taken to ensure wetland impacts will be avoided when developing this area. Information has also been provided in the Final AUAR to identify the possible circumstances under which impacts to wetlands can genuinely be considered anything but avoidable and the specific conditions required to be followed and incorporated by a developer have also been discussed.

*Item 17 (page 34) cites a city of Mankato (City) zoning ordinance that requires no more than 40 percent of a lot be covered by structures. We recognize and appreciate the City's efforts to restrict the building of structures, which are a main source of impervious surface. Uncontrolled increases of impervious acreage by property owners would likely result in detrimental impacts due to the wetlands being inundated and/or receiving untreated stormwater runoff discharges, both of which are considered violations of applicable MPCA rules and regulations. The MPCA is concerned that the existing ordinance does not address other sources of impervious surface, such as pavement, and questions whether the ordinance is adequate to control the overall creation of additional impervious acreage from all sources in the developing area, resulting in a runoff capacity greater than the stormwater treatment system is designed to handle.*

The City of Mankato appreciates the MPCA's comments regarding the City's actions to help control impervious surface coverage and stormwater runoff. The City also recognizes the uncontrolled increases of impervious surfaces by property owners which may attribute to wetlands being inundated and/or receiving untreated stormwater runoff discharges. The City of Mankato plans to discuss this ordinance through the planning commission in order to address the uncontrolled increase of additional impervious acreage in the near future. The Minnesota Stormwater Manual was used extensively for potential BMP selection and design for stormwater practices and erosion and sedimentation control. Although not explicitly defined in the stormwater section, the key concepts of Low Impact Design are infused throughout the AUAR. Please see item 17, section a. for information regarding the City of Mankato's extensive stormwater practices and the alternative stormwater management principles identified for implementation.

*In addition to the City wetland setback requirements, which are laudable, the final AUAR should also discuss how buffers will be used to mitigate possible detrimental effects upon the existing wetlands so their continued existence can have lasting ecological effects. Further, consideration should be given to placing these wetlands and buffers into a city, county, or state-owned easement to legally protect them from property owner actions.*

At this time, the City Ordinance does not require wetlands to be placed within city, county, or state-owned easements to legally protect them from property owner actions. However, the City does request all areas used for wetland replacement be dedicated to the City as an outlot once certification is complete. Generally, wetland mitigation areas are put into a drainage or conservation easement around existing wetlands on a site. The City has required conservation easements for other natural resources areas, such as stream courses and woodlands, and is currently examining the dedication of conservation easements for all wetland areas, however, at this time, it is not feasible for the City to manage the responsibility of these areas.

*The draft AUAR discusses the possibility of constructing wetlands in some areas as an alternative to conventional stormwater treatment methods. Please note in the final AUAR that the MPCA does not consider wetlands that are constructed primarily to treat a*

*developed area's stormwater to be eligible for mitigation credit. This is because these wetlands have the potential to be largely degraded due to the inundation of water and accompanying pollutants.*

In the Final AUAR it will be noted that the MPCA does not consider wetlands that are constructed primarily to treat a developed area's stormwater to be eligible for mitigation credit. However, within the Wetland Conservation Act (WCA) stormwater treatment areas which discharge treated stormwater into a wetland or public waters are eligible for mitigation credit. The treatment areas must meet the following criteria; the local government unit (LGU) has an approved and active stormwater management plan, the treatment areas are constructed in non-wetland sites, the treatment areas are associated with an ongoing or proposed project that will impact a wetland or public water, and the treatment areas are established with native non-invasive vegetative cover.

Isolated stormwater treatment ponds and wet detention basins are eligible for Public Value Credit (PVC) up to the normal pool area. Stormwater infiltration areas, up to the one year design pool, are eligible for PVC. If a two celled wet detention system is utilized the normal pool area of the upper cell is eligible for PVC; provided the upper and lower cells are separated completely by a barrier up to the ten year critical event.

The St. Paul District of the U.S. Army Corps of Engineers (USACOE) is currently working on completing their Compensatory Mitigation Policy, which does address isolated stormwater treatment areas and downstream cells of multiple cell treatment areas. In the draft policy the USACOE does not give mitigation credit for isolated stormwater treatment areas. The second and thirds cells (downstream) of multiple cell treatment areas are currently being considered for partial mitigation credit; provided that the acreage of the treatment area exceeds the size necessary to meet local and/or state requirements for water quality and stormwater retention for the project site. Other conditions with regard to water depth, basin shape and contour, and water level bounce are being proposed to promote the increased simulation of wetland function within these treatment areas.

#### *Impaired Waters (Items 12, 17, and 29)*

*As stated in the draft AUAR, the project area is located within the Minnesota River-Mankato and Le Sueur River major watersheds, both of which are listed for various impairments, including turbidity, fecal coliform, mercury, dissolved oxygen and PCBs. The draft AUAR (page 70) correctly acknowledges how stormwater impacts have the "potential to overwhelm existing water systems including ravines, creeks and rivers, possibly leading to the destruction of habitat, erosion problems, downstream sediment deposits, and/or and increase in nutrient levels." Such impacts have the potential to directly exacerbate the impairment of the Le Sueur River and the Minnesota River. Therefore, as acknowledged in the draft AUAR, these potential effects must be mitigated in order to circumvent the exacerbation of the current impairments. This can be done through multiple approaches. First, as stated above, impacts to existing wetland can and should be avoided. Secondly, if avoidance is genuinely not possible, mitigation should occur by restoring wetlands within the boundaries of the AUAR rather than through wetlands banking and creation. As part of this restoration, tiling within wetland areas should be removed and natural wetlands restored.*

*Stream velocity is of concern and can contribute to impairments within a watershed. The mitigation proposed to decrease stream velocities within Wilson Creek by reducing the size of the outletting culvert from 60 inches to 30 inches (p. 38) is not recommended as the sole solution to the issue of stream velocity. Rather – along with the removal of tiles,*

*the utilization of green space outlined in the draft AUAR, and restoration of wetlands – the restoration of County Ditch No. 12 to a natural meandering stream will allow for decreased pulsing, reduced discharge rates and improved water quality.*

*The City has the opportunity, through the choices it makes in the development of this project area, to not only mitigate the impacts of the proposed development, but also to assist with ground-water recharge and in reaching future goals set forth within the TMDLs. This can help avoid future costly restorative actions required in TMDL implementation plans.*

The stream velocity concern is addressed by more than just reducing the size of the outlet for the system. As addressed in Section 17, the proposed stormwater treatment will go beyond the traditional methods of stormwater management (i/e wet detention ponds) in an effort to provide additional treatment, slow down runoff from impervious surfaces and provide as much infiltration and exfiltration as possible with the existing soil conditions. This treatment is provided by the construction of new wetlands not for mitigation purposed but for stormwater management utilizing smaller wet detention ponds for pre-treatment. This treatment is also provided by the Vegetative and Media Filtration proposed in the future right of way for both Hoffman Road and CSAH 12. Filtration has been shown to be significantly reduce Total Suspended Solids (TSS) which directly contribute to the turbidity of the receiving water. Filtration also, by its nature, increases the time of concentration in a stormwater system which results in a lower peak discharge and velocities downstream. These two alternative treatment methods along with the large areas of green space and the proposed protection of some of the inplace wetlands will provide stormwater treatment that will help to mitigate some of the effects of the proposed increase in impervious surfaces.

#### Wastewater (Item 18)

*The draft AUAR (page 41) states that the Mankato Wastewater Treatment Plant (WWTP) is not anticipated to need any improvements to increase treatment capacity as a result of the project. However, when continued growth in other areas, such as Lake Washington Sanitary District and the addition of new areas, such as Madison Lake are also considered along with the proposed AUAR project area, it is anticipated that the WWTP will need improvements to increase treatment capacity. The WWTP's permitted average wet weather (AWW) flow is 11.25 million gallons per day (MGD). The WWTP has had AWW flows of 10.3 MGD and 9.4 MGD in 2005, and an AWW flow of 9.8 MGD in 2006. This does not leave a lot of room for additional growth over existing conditions without raising some concerns over consistent treatment capacities of the WWTP. Please address this issue in the final AUAR. If you have any questions about the Mankato WWTP or wastewater treatment in general, please contact Mr. EuDale Mathiason at 651-296-7195.*

The AUAR discusses the future capacity needs as a result of the cumulative impacts of this project with the addition of other areas in the Mankato service area, including the Lake Washington Sanitary District (which has an agreement limiting the number of hookups), and potential future service areas, such as Madison Lake, Eagle Lake, and other surrounding lake districts. The information in the AUAR includes the current capacities of the existing WWTP and the capacities needed to accommodate the flow from the existing Mankato service area, the AUAR area, the Lake Washington Sanitary district and future flow from Madison Lake and the surrounding lake districts. The City of Mankato's wastewater treatment facility currently has the capability of treating 22 MGD on a sustained basis and a peak day capacity of 42 MGD. As part of the update of the City's Sanitary Sewer Master Plan Update, the average daily flow for full development of the existing city and the expanded study area (including future flows from Eagle Lake, Madison Lake and the AUAR area) are projected to be 17 MGD.



Noise (Item 24)

*Although it will be the responsibility of the developer(s) to ensure that noise levels do not exceed the standards in Minn. R. ch. 7030, noise mitigation measures should still be included in the mitigation plan. Imperceptible increases in noise levels do not ameliorate a violation and noise must be addressed for future residential areas within the AUAR limits. While this is included in Item #24, it should also be addressed in the mitigation plan.*

*Please note that vegetation is not an effective noise barrier (FHWA Highway Traffic Noise Prediction Model, FHWA-RD-77-108). Vegetation must be dense, 30 meters deep and 5 meters above the line of sight to reduce noise levels by 5 dBA.*

*Any questions about noise standards should be directed to Anne Claflin, 651-282-6672.*

Information addressing noise mitigation discussed in Item 24 has been added to the Final Mitigation Plan as requested.

*Again, thank you for the opportunity to review this project. We look forward to receiving your responses to our comments. Please be aware that this letter does not constitute approval by the MPCA of any or all elements of the project for the purpose of pending or future permit action(s) by the MPCA. We may have additional comments or requests for information in the future to address specific issues related to the development of MPCA permit(s). Ultimately, it is the responsibility of the project proposer to secure any required permits and to comply with any requisite permit conditions. If you have any questions concerning our review of this draft AUAR, please feel free to contact me at 651-296-8011.*

**3. Ronald Wieland, Senior Planner, Environmental Review and Planning Unit, Division of Ecological Services, MN Department of Natural Resources**

*The Department of Natural Resources (DNR) has reviewed the Draft Alternative Urban Areawide Review (AUAR) for the Greater East Mankato Infill Service District, City of Mankato, Minnesota. We offer the following comments for your considerations.*

Item No. 10 – Cover types (pp. 16-17)

*The Draft AUAR has been prepared according to the Environmental Quality Board specifications for this item. However, it would be useful to show a comparison of the acreage of each general cover type before development to coverage estimated for the three scenarios after development. It is useful to have a before and after cover comparison to show the amount of land converted from vegetative cover to impervious surface, from forest to clearings, etc. The comparison would better enable developers to understand the amount of increase of impervious surfaces and loss of wildlife habitat or forest/grassland cover. Also, the developers would have a better understanding of stormwater management issues as discussed in the following comment.*

The City of Mankato appreciates the comments and input provided by the DNR. The City agrees with the DNR's comments that it would be helpful to show a comparison of the acreage of each general cover type before development versus the coverage estimated for the three scenarios after development in order to provide a tool for developers to better understand the amount of increase of impervious surfaces, the loss of wildlife habitat or forest/grassland cover, and to assist in understanding stormwater management issues. However, due to the key feature of this AUAR being prepared as a proactive master planning document to address potential environmental issues through the review of a large geographical area instead of

focusing on a specific development concept plan, any information providing a comparison of the acreage of each coverytype in comparison to the coverytype after development would be inaccurate because there are no current plans for project build-out or development. The city hopes the same goals mentioned above can be obtained through the information already provided in the AUAR, specifically Sections 9. Land Use, 10. Cover types, and 12. Physical impacts on water resources; Exhibits E-3. Scenario C. Future Land Use Map, J. Hydrology Features Map, and K. Potential Wetland Areas Map; and Appendix F. Natural Resources Assessment Inventory.

Item No. 17 – Water quality, surface water runoff (pp. 32-39)

*The Minnesota Department of Natural Resources (DNR) requests that further consideration be given to the development of the stormwater management plan in the Draft AUAR. The Minnesota Stormwater Management (MSM) manual is available from the Minnesota Pollution Control Agency (MPCA) to assist your efforts in addressing surface water runoff. The MSM system provides guidance on ways to employ natural features like wetlands, natural topography, undisturbed soils and open space to minimize impacts caused by construction activities and the resulting increase of impervious surfaces on the project area.*

*The Minnesota Stormwater Manual serves as a valuable resource for professional stormwater managers, introduces newcomers to the stormwater management field and provides practical stormwater management practices. The web address for downloading the manual is: (<http://www.pca.state.mn.us/publications/wq-strm9-09.pdf>).*

*Implementing the MSM approach will require a more complete understanding of the quality and volume of runoff, pre- and post development. The goal is to match infiltration rates at the predevelopment volume. However, development to enhance or increase local infiltration should be used when possible.*

*MSM stormwater volume reduction methods that incorporate infiltration, evaporation, storage, conveyance and landscaping techniques should be more clearly defined in the Draft AUAR. This will help the project achieve a sustainable, Low Impact Development (LID) standard. The MSM manual encourages developers to use a multifaceted approach by incorporating a variety of techniques to reduce the rate and volume of runoff. Employing these design features will increase the sustainability of the project by minimizing the destructive aspects of excessive stormwater flow both on-site and downstream from the site.*

*Selecting the Best Management Practice (BMP) that are cost effective and simple to apply will pose considerable challenges. This may require taking a step back from project developments completed thus far. If BMPs are implemented, there will be considerable benefits realized throughout the project area. Overall aesthetics of the site and the value of project developments will increase. Current and future MSM techniques can and will be virtually invisible, less expensive to crease and maintain, and will require fewer infrastructure requirements.*

*We are pleased with your efforts to protect and buffer the large wetland corridor. In addition, we suggest that the development incorporate additional green space in other parts of the DAUAR project area. Interspersing green space throughout the project area and establishing proper zoning and development ordinances will effectively raise the environmental quality of the entire project area. Prospective residents of new subdivisions increasingly value the chance of living closer to parks and open spaces.*

*Thank you for the opportunity to review this document. Please contact me with any questions regarding this letter.*

Stormwater management is of utmost concern to the City of Mankato. In preparing the AUAR, the Minnesota Stormwater Manual was used extensively for potential BMP selection and design. Although not explicitly defined in the stormwater section, the key concepts of Low Impact Design are infused throughout the AUAR. As mentioned, significant open area is being preserved in the planning area, which will have a positive impact on stormwater management.

Many criteria were evaluated when selecting the major stormwater BMPs to focus on in the AUAR. One of the critical factors in this decision is the soil profiles throughout the study area, which are typically classified as C/D soils currently in agricultural production. Many of the volume reduction measures described above rely on permeable subsoils with lower groundwater tables. Unfortunately, that is not what is predominate in this area. Therefore, we have selected BMPs that are suitable for the watershed, but yet employ many of the concepts described above. We fully anticipate that as development occurs, the MSM will be an integral part of the planning process.

#### **4. Tim Grant, Environmental Health/Wetland Specialist, Blue Earth County**

*Enclosed are some of the County's comments concerning the draft AUAR for the GEMISD AUAR service area. If you or your consultant has any questions please feel free to call me at 304-4381.*

#### **12. Physical impacts on water resources.**

*A Potential Wetland Evaluation was developed by I&S Engineers & Architects to identify potential wetland areas within the GEMISD AUAR service area. Some field identification was also conducted as part of this evaluation. This evaluation is shown as Exhibit J—Hydrology Features Map. Several parcels within the GEMISD AUAR service area have already had a full wetland delineation conducted on them. These areas should be separated out from the potential wetland areas on this map and shown as delineated wetland basins with a different color.*

As stated in the AUAR, the Potential Wetland Areas Map (Exhibit K) was completed to give greater detail regarding possible wetland areas within the project area. The wetland areas shown are not based on an official wetland delineation and the information presented is only intended to be utilized as a planning and informational tool. If there are areas within the AUAR that have had wetland investigations completed and approved by the County, then this information will be included in Exhibit K if the County provides the information. Areas within the AUAR area that have had wetland delineations completed but not approved will not be shown in Exhibit K since this information is private information and has not been approved by the Local Government Unit.

*Much of the GEMISD AUAR service area consists of agricultural, land. The Wetland Conservation Act (WCA) allows for drainage of agricultural land containing any Type 1 wetland other than hardwood bottoms and Type 2 & 6 wetlands less than 2 acres in size under an agricultural exemption. However, this exemption only applies if the drained land remains in agricultural production for 10 years after the drain tile or ditch was added. The vast majority of the agricultural/drainage exemptions are simply taken rather than permitted (documented with the LGU) underneath an exemption. Because of the possibility for violations of the WCA in regards to areas with recent agricultural drainage, it*

*would be beneficial to identify agricultural land within the GEMISD AUAR service area which has been tiled, ditched, or drained in another fashion anytime in the last ten years. Blue Earth County is familiar with at least one agricultural field in the GEMISD AUAR service area which contained wetland prior to a drainage swale and tile addition/repair. This area is just east of Highway # 22 in a location which may very easily be developed in the near future and does not current show up on Exhibit J—Hydrology Features Map.*

The City did not use AUAR process to evaluate the potential for development of each parcel of property nor was a wetland investigation completed for every parcel in the AUAR area. Rather, the City used the AUAR process to identify the environmental impacts associated with the 'worst-case scenario' for certain land use developments. The AUAR did not provide agricultural drainage information since only a limited amount of drainage information is publicly available. Only identifying the agricultural land within the AUAR area which has been publicly tiled, ditched, or drained in some fashion anytime during the last ten years would inaccurately portray the drainage system in the AUAR area and could be misinterpreted to include private drainage information as well. Drainage information for a parcel is more accurately reviewed on a parcel by parcel basis, as with wetland investigations. The City is not aware of the project you specifically wrote about. However, the City will review any information the County will provide now or in the future to ensure future developments in the City adhere to the Wetland Conservation Act regulations.

### **13. Water use.**

*The EAW guidance for this section clearly indicates that the Minnesota Department of Health recommendation is to conduct a complete field well inventory on properties affected by the proposed project. This apparently has not happened with only some limited data gathered from the County Well Index (CWI). Exhibit O—Water Supply System Plan shows the approximate location of wells identified in CWI. However, these wells are not appropriately labeled with their unique well numbers as indicated underneath the description for this section. The County Well Index typically only identifies wells which are in use or drilled after 1974. A few older wells which have been identified by the Minnesota Geological Survey (MGS) may be listed in the CWI. A quick review of the Blue Earth County well records indicates 17 additional wells within the GEMISD AUAR service boundary which have been properly sealed by a licensed well contractor and issued H-Series sealing numbers. For planning purposes this well sealing information would also be helpful to be included in the AUAR.*

*There are 34 building sites located within the GEMISD AUAR service boundary. Most of these building sites contain homes which are probably service by privately owned water wells. A map showing all of the existing building locations alongside of or included with the updated Water Supply System Plan map (Exhibit O) would be beneficial for the sewer and water extension projects projected for the GEMISD AUAR service area. The updated Water Supply System Plan map (Exhibit O) should show the Unique & H-Series numbers for all of the known wells within the GEMISD AUAR service area. Specific information about the age of all of the existing structures on each of the existing building sites may be obtained from: [www.blueearth.minnesotaassessors.com/](http://www.blueearth.minnesotaassessors.com/). This information may be combined with information assessable from the CWI to help determine if an existing building site is likely to contain an abandoned well or not. For instance, if CWI indicates that the current well in use was drilled in 1979 and the above website indicates that the original home on that same property was constructed in 1905 then there is a very high likelihood that the site contains at least one abandoned well, if not more than one, which would need to be located and properly sealed. It even appears that the inquiry from I&S to the local MDH personnel concerning public water suppliers within the GEMISD AUAR*



*service area has spurred the MDH to order the sealing of an abandoned well located at the KTOE site.*

*An assessment should be made within the GEMISD AUAR service area to identify any old building sites which are no longer present. This will provide locations within the GEMISD AUAR service area which will likely be required to have an abandoned well search conducted prior to any future development.*

*There is a test well drilled on June 06, 1975, identified by unique well # 213687 which is located within this GEMISD AUAR service area. This well was field verified and gamma logged by the MGS. The well log reveals that this test well is 605 feet deep with no casing! There is currently no record showing that this test well has been properly sealed. This well record reveals that this well consist of a multi-aquifer well which extends through the St. Peter/Prairie-Du-Chein/Jordan aquifer, St. Lawrence confinement unit, Franconian/Ironton-Galesville aquifer, and into the Eau Claire confinement unit. This well, if not properly sealed, presents a distinct danger to the local groundwater supply in this area. This well is currently not under the jurisdiction of Blue Earth County but is under the jurisdiction of the Minnesota Department of Health (MDH). Peter Zimmerman of the Rochester MDH office may be contacted regarding this test well.*

The City of Mankato thanks the County for the additional information regarding private wells within the AUAR area. The City has obtained information from the County regarding the additional wells in the AUAR area mentioned above. The location of these wells, along with the Unique well number and the H-Series numbers will be added to Exhibit O—Water Systems Plan Map. Information will also be included in the Final AUAR text under Section 13. Water Use which details the procedure provided by the County for determining the likelihood of an abandoned well being located on a specific parcel. In reference to the specific example mentioned regarding unique well # 213687, the City has no information regarding this well since it is not under city jurisdiction.

The City of Mankato recognizes the importance of locating existing wells in order to maintain distance between wells and sources of groundwater contamination. In response to the request for an assessment to identify any old building sites which are no longer present to determine the potential for abandoned wells, historic aerial photography was reviewed from 1958 and 1991 in order to identify old farmsteads, homes or industrial wells within the AUAR area. Information was also obtained from Blue Earth County through their review of historical aerial photographs and related data to determine potential abandoned well locations. These locations have also been provided in Exhibit O—Water Systems Plan Map as 'Potential Well Locations (Blue Earth County)'.